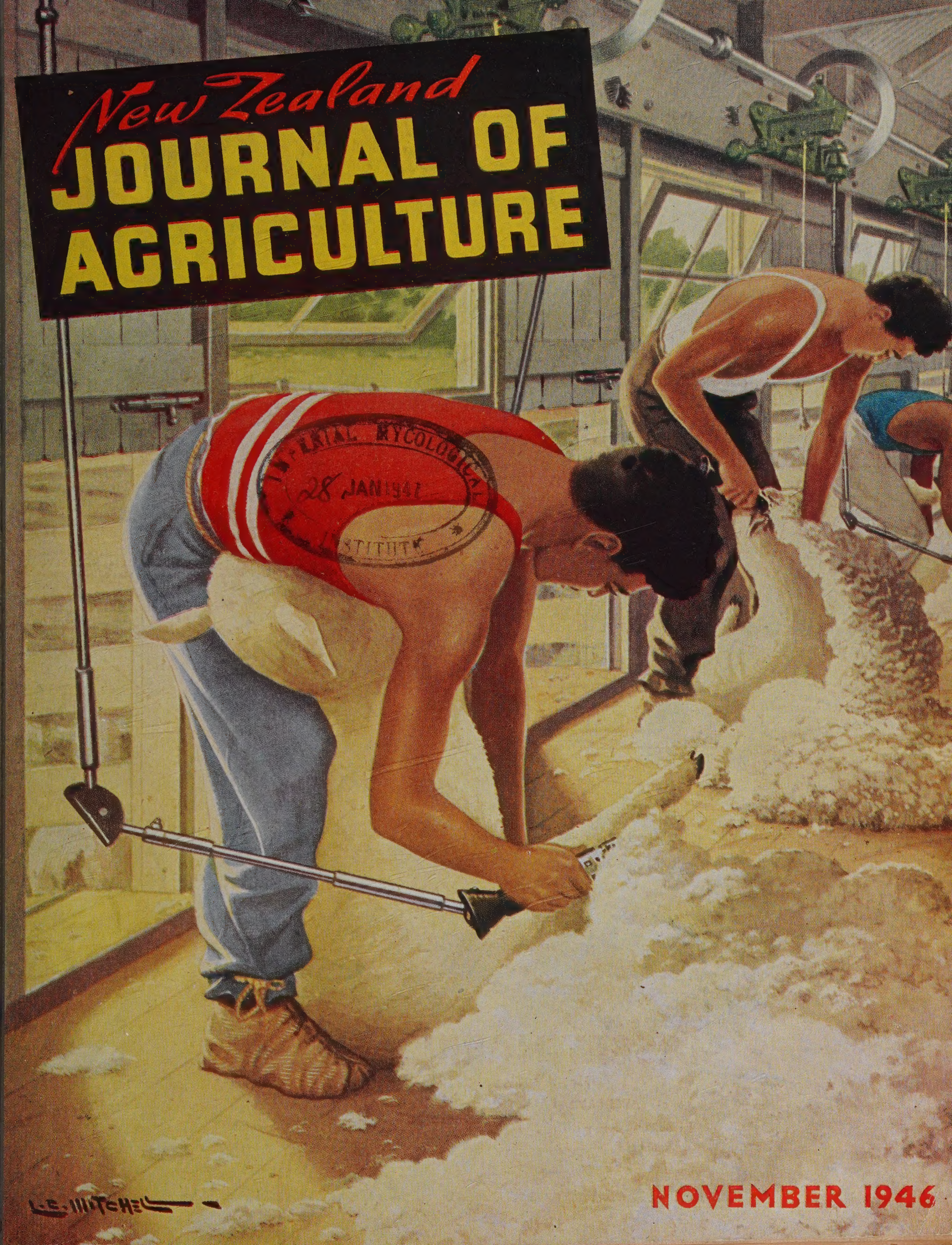
New Zealand JOURNAL OF AGRICULTURE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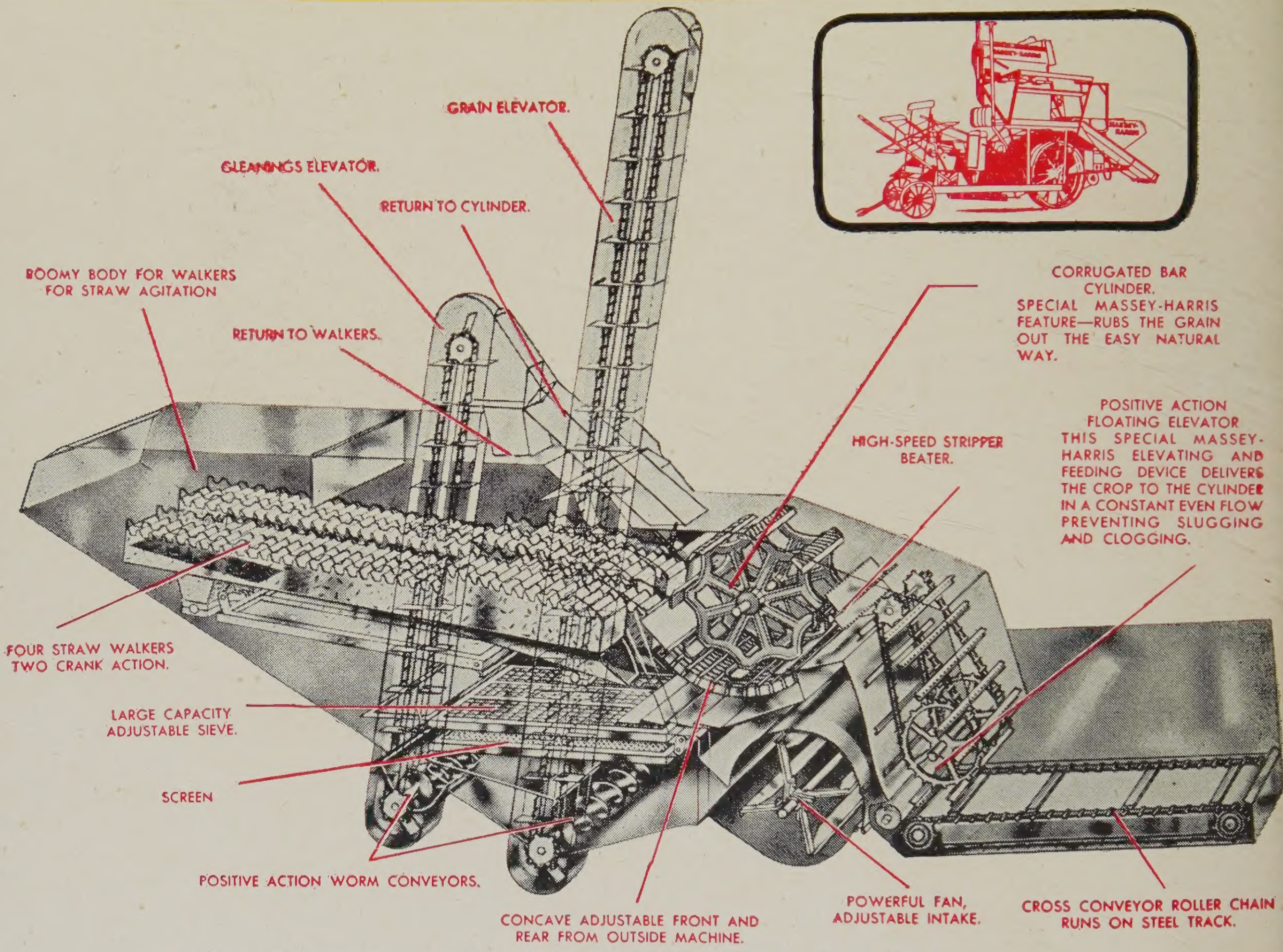
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SOIL FERTILITY RESEARCH STATION

By **R. E. R. GRIMMETT,** *Superintendent, Soil Fertility Research Station, Hamilton.*

AN area of some 60 acres comprising the homestead block of the Halls Vegetable Project, about 3 miles south-west of Hamilton on the main road to Te Awamutu, was officially constituted the Soil Fertility Research Station of the Fields Division, Department of Agriculture, on January 1, 1946. The objectives of the station are to carry out research work in connection with the many phases of soil fertility, and to pass on to instructors and other members of the Department, and to the farming community, information which may be of use in the conduct of field experiments and advisory work and in helping to maintain and improve the productivity of pastures and crops.

IN its present form the station is only the nucleus of an institution which ultimately will comprise central laboratories, library and administrative buildings, field experimental technique and research projects, greenhouse and pot experiment installations, sub-stations for investigation of local problems of soil fertility or fertiliser utilisation, and an advisory service to farmers through the fields officers of the Department in relation to plant nutrition and soil fertility.

At present the laboratory staff are located at the disused Galloway ammunition factory, but as this involves a journey of five miles between the station and laboratory it detracts from the most effective form of co-ordination of research activities.

Under these handicaps, however, a programme has been drawn up and a commencement made with a variety of projects which may be grouped under the following headings:—

Scope of Activities

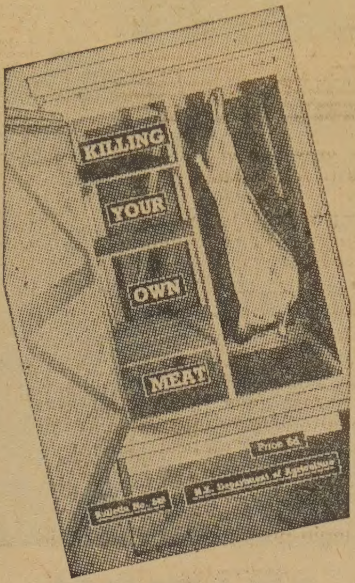
Field Research.—This is designed to deal specifically with soil problems in the field, and work planned in the immediate future is intended to give data on the various techniques of the measurement of pasture growth, on the response to various fertilisers of the Hamilton clay loam and peat soils of the Waikato Basin, on the effect on pasture production of various forms of added nitrogen, and the relative efficiency of certain fused phosphates both from overseas and locally manufactured. Provision has also been made for the laying down of variety trials on feed barleys and subterranean clover.

Weed control.—Although this forms part of field research, its importance warrants separate treatment. Work is proceeding on the relative efficiency of various weedkillers, including the relatively new hormone types. Attention is being largely concentrated on ragwort and blackberry. The programme for this work will be greatly expanded during the ensuing year to give information on the control of such other important weeds as nassella

Above.—General view of one of the principal experimental areas on the station with the weed control plantation and field laboratory on the right.

Killing Meat On the Farm

The finer points of butchering are clearly dealt with in this bulletin, which discusses the most hygienic and efficient methods of killing for meat on the farm.



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New Zealand Journal of Agriculture

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tussock and Californian thistle. A herbarium of weeds and pasture plants is being formed as a background and aid to this work.

Quick Soil and Plant Tissue Testing.—Using work done overseas as a basis, a start has been made in the use of quick test methods for diagnosing deficiencies of the major elements in plants and soils. Experimental kits are being provided to selected Instructors in Agriculture for extensive try-outs under field conditions. It is the aim of the Fields Division to build up as soon as possible a comprehensive service to farmers.

An attempt to induce and study the effect of mineral deficiencies in plants of both major and minor elements is being made at the station.

Laboratory and Pot Culture Studies.—The principal aim of the soil laboratory is to select or devise methods for determining available plant foods which will give results closely correlated with actual crop yields as measured in field experiments. For this purpose a variety of methods, including pot cultures, is being applied to the same areas as are used for field trials. This work and that of the general chemical laboratory are dealt with more fully under separate headings.

Miscellaneous.—Two phases of soil investigation which it is planned to develop in the near future are lysimetry and microbiology.

(a) Lysimeters or soil drainage gauges will be installed to give data on relative utilisation and losses of soil nutrients, including water, under both pasture and arable crops. Information will also be obtained by this method on the amount of water used by various pasture plants and crops under different manurial treatment.

(b) In microbiology there are many problems of plant food utilisation which can be adequately studied only with a knowledge of the part played by soil organisms including bacteria, fungi, protozoa, and worms. As facilities become available problems such as the efficiency of nitrogen fixation and utilisation as influenced by liming, cultivation and organic manuring, and the defining of factors influencing the numbers and activity of the worm population, particularly in relation to special soils such as peat, will be studied.

The Present Position

When the station was taken over in January of this year it was largely under bare fallow, with the exception of two small areas of permanent pasture and a larger area sown in October, 1945, with Italian ryegrass. It was the ultimate intention that a comprehensive pasture measurement technique trial be established on part of this latter area known as F.2, and to prepare the way for this trial the Italian ryegrass was sown with the objective of cutting it, with the two-fold purpose of providing data for a uniformity trial and also data upon the extent to which a single crop of Italian ryegrass is responsible for removing accumulated plant nutrients from the soil.

Pot trial with indicator plants. Turnips growing on soils from the station with various amounts of phosphates.

Climatic conditions throughout the summer and early autumn were extremely dry and no rain of any significance fell between November and the latter part of March. Although the Italian ryegrass struck quite well and gave a good cover, it did not grow beyond the 6in. stage, and consequently the original plans for its use had to be abandoned, and it was ploughed in towards the end of March, and the area resown with the following mixture:—

	lb.
Certified perennial ryegrass ..	25
C.23 cocksfoot	6
Certified Italian ryegrass ..	5
Certified white clover	2
Certified Montgomery red clover	3

The same mixture was also sown on the areas that had been left fallow throughout the summer, with the exception of a portion set aside as a Barley Variety Trial. Warm rains were experienced shortly after the sowing, with the result that germination was rapid and growth came away well. All these areas are now being grazed with sheep to consolidate the soil and prepare a suitable sole of grass for topdressing and technique trials for measurement of pasture growth.

Barley Variety Trial.—A replicated plot trial has been laid down to compare the feeding value of Newall, Oderbrucker, Cape Smooth Awned, Cape Rough Awned, Black Skinless, and Wong barley varieties.

Holland Coulter Trial.—A paddock known as H.1 was sown on December 4 with Italian ryegrass in three different ways:—1. Broadcast; 2. Drilled in 7in. rows; 3. Drilled through Holland coulters.

In general the trial showed that during the dry weather experienced either form of drilling gave a quicker establishment and more vigorous early growth than broadcasting. The Holland coulters gave a better distribution of plants than in the ordinary drilled area and would appear to be a useful method of sowing pastures on areas subject to prolonged drought.

Single-plant White Clover Sward

In topdressing trials on mixed pasture swards a considerable degree of replication and repetition of treatments over several years is often necessary before significant results are achieved. The main reasons for this are:—1. Non-uniformity in soil and botanical composition over the experimental areas; 2. Different response levels in the various pasture components; 3. The fact that the primary response, especially to phosphates, is often chiefly in the clovers, and the full response is not shown until the clovers have made a corresponding increase in the amount of nitrogen available for the growth of grasses, especially ryegrass. Where the object is not so much to determine the manurial requirements of soil as to compare the relative efficiency of fertilisers of different types, but containing the same nutrient, as for example basic slag and reverted superphosphate, the task may become, from purely technique reasons, very protracted and difficult.

While the ultimate answer to such comparison must be given by the grazing animal in trials on a paddock unit basis, it is probable that much preliminary exploration, particularly with new fertilisers or refractory soil types, could be made with the use of a standard sward of a plant particularly responsive to fertilisers such as pure clover species.

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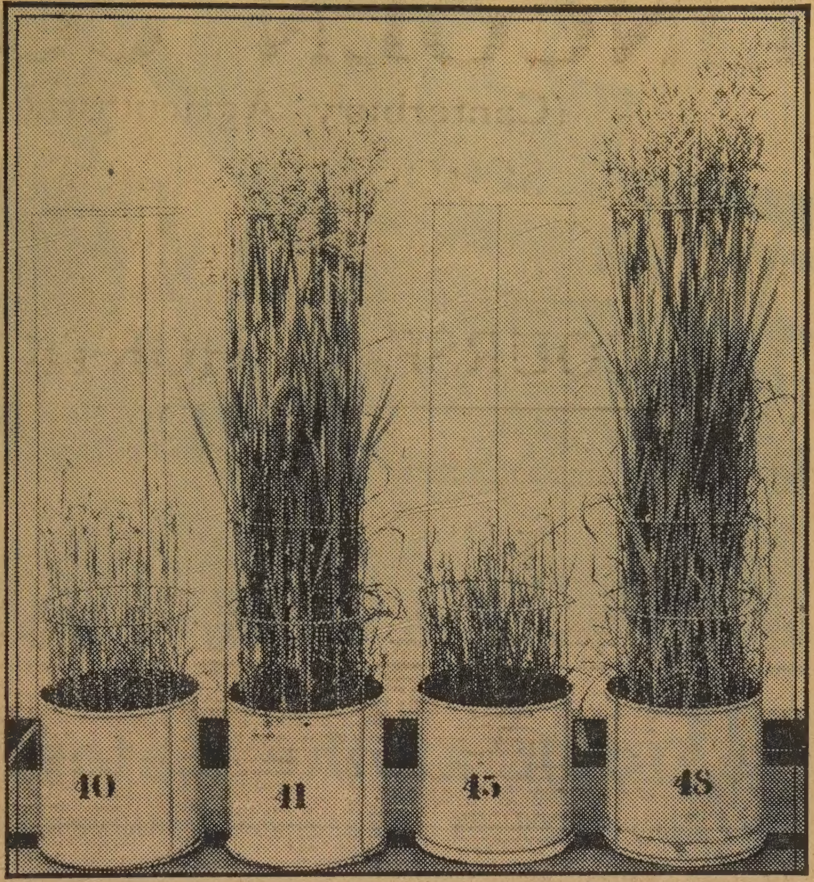
Such a sward has been developed at the Soil Fertility Research Station by the multiplication of plants by repeated subdivision of a single original white clover plant. In one trial some 16,000 clover cuttings have been established, and with careful weeding have now made an almost continuous cover.

A further refinement is now being introduced in the use of a distinctively-marked white clover plant supplied by the Plant Research Station, Palmerston North. This will simplify the identification and removal of unwanted volunteer white clover.

The first stage after the sward has been established is the taking of a large number of cuts or mowings from unit areas on the different subdivisions or plots of the trial. The weights of dry matter produced will provide data to determine the normal variations between plots due to such factors as soil fertility gradients, moisture differences, etc. In the initial trial soil samples have also been taken from all plots for analysis to provide an independent measure of variability.

The next stage will be the application of a simple and well-differentiated series of manurial treatments followed by repeated cuttings and recording of dry matter yields to provide material for a statistical study of the techniques.

Finally, if successful, the method may be used either on the station or in other districts to obtain data for the estimation of comparative efficiency of fertilisers, or of the growth response to the same fertiliser at varying rates or frequencies of application.



Part of a Mitscherlich pot experimental trial.

Other Techniques

The procedure outlined for the white clover project will also be followed, with suitable modifications, in the other techniques for measuring pasture growth which are being studied or developed at the station. Of these the basic method, designed to correspond most closely with farming conditions, is the use of small movable enclosures of a size to be determined by preliminary trials in miniature (1/10 acre) paddocks which will be replicated for treatments and grazed with sheep under a rotational system with adjustment of numbers to growth by the use of similarly-topdressed holding paddocks.

By shifting the enclosures at intervals and mowing and weighing the growth at each shift a record of dry matter production is obtained without interfering materially with the sward. A pilot trial has also been commenced using sheep to indicate production. The principle is to maintain the weight of the sheep constant by varying their numbers per acre according to production from each treatment, without consequent damage to the pasture. By means of recording the number of sheep carried at constant weight over a given period a comparison of the productivity of the various areas can be made.

Winter Grass Production

Two series of plots have been established upon which investigations of responses to nitrogenous fertilisers are being carried out and also fundamental studies on the soil nitrate and ammonia status with and without treatments. One of these series of plots is situated on a typical area of the Hamilton clay loam. The other is situated on a flat area of Te Kowhai loam. A further series will be established on an area of peat adjacent to the station, which is being leased for experimental purposes.

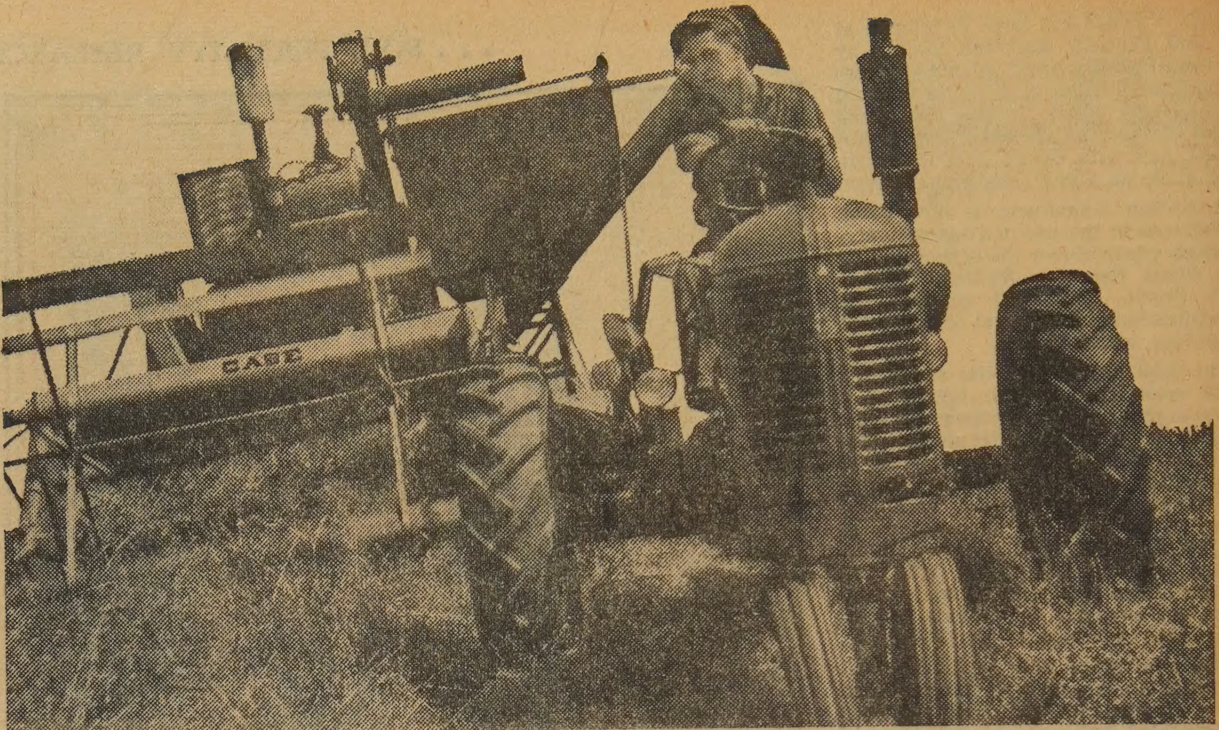
Crop Nutrition

Methods developed chiefly in the United States for the detection of nutritional deficiencies in crops by the use of chemical tests and analyses and by visual symptoms are being studied both in the field and the laboratory. To provide material for these studies an area of Hamilton clay loam from which the topsoil had been partially removed to lower the fertility has been planted in a variety of vegetables and crops and subdivided into differentially-manured plots. In general the principle has been followed of supplying an excess of all nutrients except one to each plot, ringing the change throughout the range of both major and minor elements.

Owing to the drought and the lateness of the growing season results this year have been below expectations, but useful experience has been gained with tissue-testing technique and in some instances growth differences have been spectacular. Under no conditions could a relative deficiency of potash be induced, indicating that the level of available potash in this soil is high. On the other hand responses to phosphate and to a lesser extent to nitrogen were marked, and these were easily demonstrated in the sap tests.

Chemical Research

Considerable attention is being paid in the laboratory to the development of rapid methods of testing soil and



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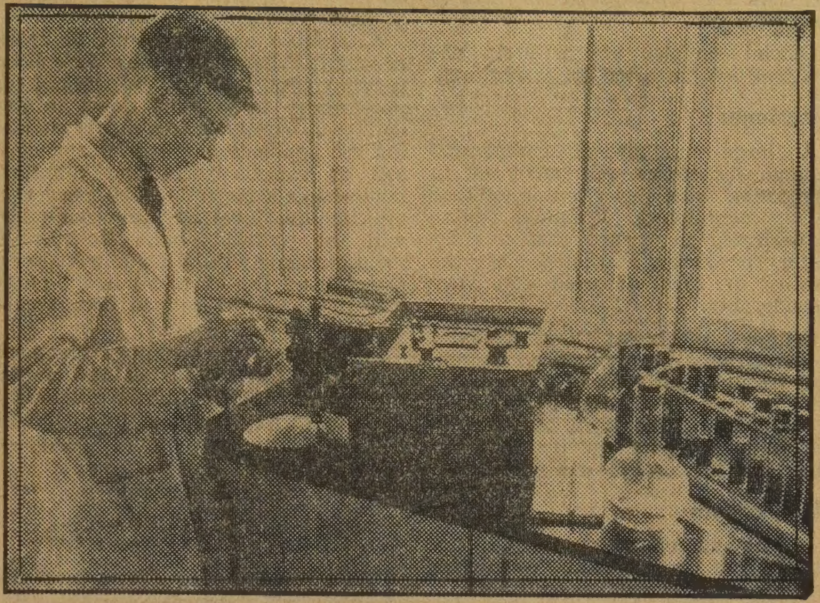


Determination of pH of soil samples in the laboratory.

crops for plant food status. A prospect of wider utilisation of sap quick tests (the Purdue methods) is indicated by preliminary trials on pasture species such as ryegrass and paspalum, in which deficiencies of potash and nitrate have been clearly shown and correlated with growth and soil conditions. Sets are being issued to instructors in selected areas for trial and report. It is felt that with due caution these methods will provide a valuable adjunct to instructors in their advisory work.

More accurate sap analysis methods giving quantitative data, but which can be carried out only in a laboratory, are also under examination, and it is hoped to develop tests for the detection of minor element deficiencies.

Available Plant Food

Methods of estimating available plant food are being tested on a variety of soil types with a view to finding the most reliable for use in advisory work. The Mitscherlich pot culture method is selected as a standard for comparison. Among methods in course of investigation are the Neubaner seedling method, Dyer's citric acid extract, the Egner lactate extract, various extractents of Bray, and the methods of Burd and Murphy.

On the experimental area of the station soil treatments cover a very wide range of phosphatic dressings. The available phosphate in representative samples has been estimated by a variety of methods. These differ considerably in their estimate of the order of fertility. Results are being correlated against growth in pot culture.

A large number of soil samples from the station are being analysed completely so that a clear picture of variations in the fertility of the experimental areas can be formed.

Serpentine Superphosphate

The response of oats to serpentine superphosphate and a number of phosphatic compounds on Egmont brown sandy loam, a soil particularly responsive to serpentine superphosphate, is being determined in pot cultures with a view to finding where the particular advantage of serpentine superphosphate lies.

Minor Element Experiments

A preliminary experiment on permanent pasture with lime and molybdenum combinations has shown a response to molybdenum on Okaihau gravel loam. A more comprehensive experiment and another with other minor elements are being laid down.

Observational molybdenum strips on 10 Waikato soil types have shown little response. A small preliminary trial has been started in a lucerne paddock in the Bay of Plenty.

A positive effect of molybdenum on yield of oats in pot experiments was demonstrated in the case of Hamilton clay loam and Egmont brown sandy loam.

Lime Requirement of Soils

There is an urgent need for increasing the practice of liming in New Zealand and using the limited supply to the best advantage. Soil analysis can here play an important part, for the lime status of a soil can be very clearly revealed by chemical methods. The laboratory staff is at present being built up and cannot deal with a great volume of samples. A field test has therefore been elaborated which in the hands of field officers should be capable of giving reliable results. A limited number of outfits are now being issued, but if results are favourable the service will be extended. A method of assessing the rate of reaction of various limestones has been further developed and should prove useful.

Service Laboratory

One section of the chemical laboratory is devoted to the analysis of soils, fertilisers, pasture samples, and other materials submitted by instructors in connection with their advisory and experimental work.

Topdressing Trials

In connection with the new series of observational topdressing trials now being laid down by instructors throughout the country the correlation between visual results and soil analysis is to be checked by analysis of samples of soil from selected trials from each area. The samples are first being submitted to quick tests for pH, lime status, and available phosphate, and will be stored for more detailed analysis should this appear desirable in the light of field results. In order that the trials may start on as sound a basis as possible samples of all fertilisers and liming materials used are submitted for analysis.

Experimental Areas

On Departmental experimental areas such as Marton and Winton, where pasture yield data for various topdressing and strain trials are being secured, not only are the soils and fertilisers analysed but samples of pasture are collected and forwarded to the laboratory for dry matter determination and analysis for uptake of mineral nutrients.

Other Soils and Fertilisers

Among miscellaneous soil samples dealt with are a number collected each year from Ahuriri Lagoon reclamation area at Napier, to keep check on the movement of salt at various depths.

A number of soil samples submitted by instructors from farmers' properties have been reported on for lime requirement. There are occasions when it is desirable to obtain a more complete picture of the lime status of a soil than can be provided by field quick tests, and in such cases instructors may arrange for samples to be forwarded.

Official samples of fertilisers are analysed and reported on as required.

Limestones

A large number of commercial ground limestones are analysed in connection with the granting of free railage concessions. Frequent testing is desirable to ensure that a satisfactory product is marketed, since the quality of rock quarried can vary considerably.

Samples of burnt lime recently analysed have been found to contain only about 20 per cent. of active burnt lime or oxide and about 60 per cent. of carbonate. This is in accord with the generally poor quality of burnt lime sold for agricultural purposes.

Miscellaneous

Among miscellaneous samples analysed are commercial weedicides used in weed control experiments.

Volcanic ash deposited over a considerable area by the recent eruption of Mt. Ruapehu has been found to contain nothing toxic to plant growth.

Chemical Weed Control

Investigations of chemical methods for the control of weeds were curtailed during the war, but have been resumed as part of the station's activity.

Plans for herbicide trials on ragwort were drawn up early last spring, but delays in the securing of a suitably ragwort-infested area and in the arrival of materials resulted in considerable modification of the programme. As the area ultimately secured was also infested with blackberry, it was possible to conduct trials with this weed concurrently with those on ragwort. Certain disadvantages in the choice of this type of infestation became apparent with the need for the expenditure of much time in the manual control of blackberry, and in future trials with each weed will be kept separate as far as possible.

Future Developments

Plans which have been formulated for extension of the station's activities depend for realisation upon the availability of trained staff, of suitable areas of soil and pasture, and of materials and buildings. Projects are being developed for comparing and evaluating methods for the reclamation and manuring of peat, for the installation of lysimeters to measure the leaching or loss in drainage water of nutrients from soils, and for the study of the effects and possibilities of summer irrigation of limited areas of pasture on average Waikato farms by the use of bore water.

A suitable area of about 15 acres of peat is being acquired by lease close to the station and will be worked up preparatory to grassing down in the spring. A variety of treatments including the application of gravel and clay soil at various rates and different methods of compacting the peat and altering the level of the water-table will be carried out. Concurrent measurements will be made of pasture growth and the chemical and biological status of the soil in each treatment.

In addition to installing standard lysimeters for several of the major soil types of the locality the possibility of using large drainpipes in combined pot experiments and drainage experiments is being explored.

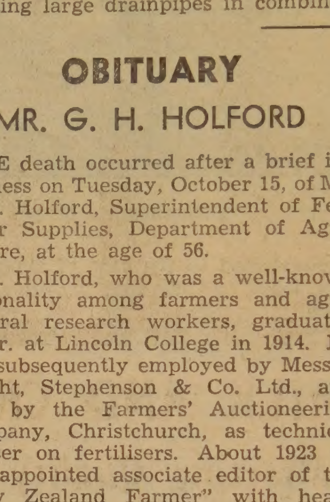
The prolonged drought throughout the Auckland Province during the past summer has emphasised the desirability of farmers making use of the abundant supplies of water under or above ground in most localities for the irrigation of a sufficient area of pasture to provide a green bite to tide stock over the critical period. This raises questions of the relative pasture production from such areas, both in drought periods and at other times, and of the most desirable pasture species and manurial programmes for this purpose. The securing of data on these points and on the quantity of water necessary to maintain growth in such summer drought periods will be the main objects of an irrigation trial which is now being planned.

OBITUARY

MR. G. H. HOLFORD

THE death occurred after a brief illness on Tuesday, October 15, of Mr. G. H. Holford, Superintendent of Fertiliser Supplies, Department of Agriculture, at the age of 56.

Mr. Holford, who was a well-known personality among farmers and agricultural research workers, graduated B.Agr. at Lincoln College in 1914. He was subsequently employed by Messrs. Wright, Stephenson & Co. Ltd., and then by the Farmers' Auctioneering Company, Christchurch, as technical adviser on fertilisers. About 1923 he was appointed associate editor of the "New Zealand Farmer" with headquarters in Christchurch, and from 1929 to 1936 he was agricultural adviser to Imperial Chemical Industries Ltd., which was developing the use of nitrogenous and other fertilisers in New Zealand.



Mr. G. H. Holford.

Mr. Holford then moved to Auckland to establish a fertiliser advisory service on behalf of northern fertiliser manufacturers, and in 1937 he went to England and Europe to attend the International Grassland Conference.

On his return to New Zealand he joined the staff of the New Zealand Department of Agriculture in Wellington as Inspector of Fertilisers, in which capacity he organised preliminary work on the preparation and use of serpentine superphosphate and later became fully occupied in the supervision of serpentine supplies and the arrangements for large-scale manufacture of serpentine superphosphate throughout New Zealand. Late in 1945 he was appointed Superintendent of Fertiliser Supplies.

Mr. Holford was awarded the Bledisloe Medal in 1935, a distinction granted annually to an ex-student of Lincoln College for outstanding services to New Zealand agriculture. His work in this connection had been associated with the founding of many services which are of distinct benefit to farmers at the present time. He had been active in the formation of the Wheat Research Institute, the New Zealand Grasslands Association, and the Greenkeeping Research Institute, and he had always been a strong initial advocate of irrigation in Canterbury. From the time he formed a Soils Improvement Committee in Canterbury, which led to the present scheme of fertiliser and crop experimentation of the Department of Agriculture, Mr. Holford was a keen advocate of agricultural research, and the farming community, the fertiliser industry, and the Department will feel the loss of his wide knowledge of fertilisers.

Mr. Holford is survived by his wife, a son who is taking up a farming career, and a daughter.

MAINTAINING MILK AND CREAM STANDARDS

Tracing of Defects Affecting Quality

THE maintenance of the quality of New Zealand's dairy produce is beset with a number of complications of unsanitary conditions, production defects, and feed taints. In this article G. Purvis, Superintendent of Butter Instruction, Hamilton, describes how by co-operation between the factory manager, the Farm Dairy Instructor, and the supplier the origin of some typical troubles has been traced, and recommends general hygiene practices on the farm which would result in a higher grading at the factory.

A CHECK on the sources of inferior milk and cream, additional to that represented by the routine visits of Farm Dairy Instructors to farms, is supplied by the instructors keeping in frequent touch with factory managers, who inform them of the names of suppliers the quality of whose produce appears to be affected by undesirable conditions at the farm. Inferior milk or cream may be inspected at the factory by the instructor and the cause traced back to shed conditions at the farm or to the pastures if feed taint is suspected.

Grading of Milk and Cream

If the utmost benefit is to be gained from Farm Dairy Instruction, both milk and cream should be graded in accordance with the standard set by the cheese or butter instructor or special inspector. Any lowering in the standard of grading is likely to be followed by a relaxation of effort by suppliers, nullifying to a large extent the work of the Farm Dairy Instructor.

Suppliers whose plant has been found in an unsanitary condition have told instructors that because their produce was being graded "Finest" they thought everything was all right. The high grade cannot, however, be accepted as an excuse for unclean plant.

Some daily collected creams produced under unsanitary conditions do get through as "Finest" in cold weather when a cooler is used, but when the nights are warm the defect usually becomes evident. The same is true of milk too, though not to the same extent.

Factory managers usually know which suppliers send in milk and cream which is inferior after a warm night and passable during cold weather. They also know those the quality of whose produce is invariably outstandingly good irrespective of weather conditions.

It is with the questionable supplier that the Farm Dairy Instructor can help the factory manager during routine visits, as he is made to clean up, even although he is getting the highest grade. No factory manager need feel, therefore, that the standard of milk or cream grading is too severe. Grading on a lower standard encourages lack of effort on the part of the supplier. The quality of the butter and cheese is only as good as the raw material from which it is made, and a lower grade product will not enhance the reputation of the manager.

In some scattered areas where it is not possible for the Farm Dairy In-

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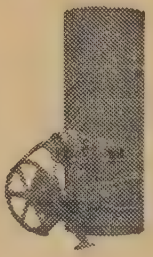

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structor to visit factories regularly companies supply instructors with weekly lists of the names of suppliers of inferior cream and they are visited immediately. The following are typical of numerous instances in which instructors have been able to trace defects and have the causes remedied.

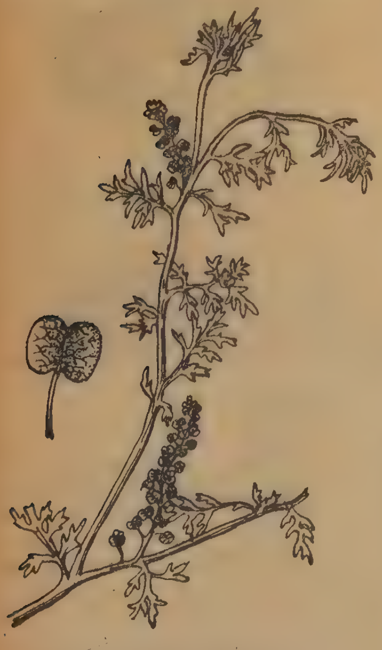
Water Pollution

On one farm where the plant was found reasonably clean the water from the electric heater had a stale, foul odour. The skim-milk pump was being used to pump water for the shed and this was found to be the cause of pollution. A water pump was installed and a new source of supply secured, the piping, tank, and heater were thoroughly cleaned, and the defect disappeared.

Land Cress Flavour

Land cress flavour which appeared in the butter of South Island companies was traced to land cress on several farms in the supply area—in old potato patches, in ground which had previously been covered by haystacks, around cowyards, and in cow tracks and gateways. On one farm manure carted from the milking shed was left so long in small heaps in a paddock before spreading that grass under the heaps was killed. Although the remainder of the paddock had a good sole of clean pasture, the area under the manure heaps was bare of grass and heavily infested with cress.

With the co-operation of suppliers dry stock were grazed on the affected areas and the thickening of pasture swards encouraged by controlled grazing and the avoidance of over-stocking. This smothered the cress and the defect has not since been evident.



Coronopus didymus: Twin cress, land cress, or hog cress.

As numerous farmers were unable to identify the land cress, plant samples were carried by instructors and shown during routine visits and the effect on milk and cream described. The reduction in cress infestation on these farms in the past few years has been very evident.

Recommendations for pasture and herd management in areas affected with land cress were contained in articles in the "Journal of Agriculture" of July, 1941 (Vol. 63, p. 31), by A. V. Allo and F. H. McDowall, and of July, 1946 (Vol. 73, p. 15), by A. V. Allo.

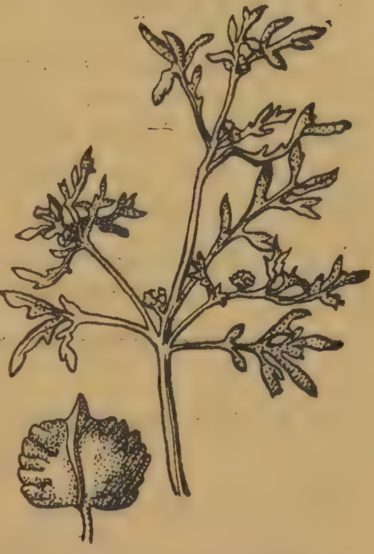
Lack of Boiling Water

Considerable yellow slime was found in the machine on one farm, though the remainder of the shed and plant was particularly clean. The owner said he was using caustic soda as directed and was under the impression that the water from the electric heater was boiling. When the instructor checked the water in the heater by thermometer just before the morning wash-up it was only 146 degrees. Arrangements were made to have the temperature of the water raised to boiling point before washing the machine, and on later inspection the machine was found to be satisfactory.

In another case cream collected daily was returned from the factory as unsuitable for making butter. The milking shed and all visible parts of the machine were clean, but the interior of the machine was in a very insanitary condition. The apparatus for boiling water was found to be unsatisfactory, and after the plant was cleaned up and the owner procured a new pumice copper and agreed to boil the water his cream improved considerably in grade.

The necessity to have the water really boiling before use cannot be over-emphasised. The Department of Agriculture's Bulletin No. 118, "Cleaning of Milking Machines," recommends adequate cold water for flushing the machine before and after milking and the use of boiling water, caustic soda, and unsatisfactory brushes for cleaning milk pipe and other metal parts. If the water is not boiling or brushes unsatisfactory or in bad repair, cleaning will prove ineffective. (Bulletin 118 is available from officers of the Dairy Division, Department of Agriculture.)

Farmers are frequently under the misapprehension that because water is very hot it is boiling or nearly so, and as they carry out cleaning instructions they expect it to be effective. The deposit due to inefficient washing gathers in the interior of the machine and is visible only through the special instruments used by Farm Dairy Instructors. The exterior of sheds and machinery is often kept in spotless condition where inspection reveals interiors far from satisfactory.



Coronopus procumbens: Wart cress.

Farmers who always use boiling water, carry out cleaning as directed, and maintain a uniformly high standard of cleanliness throughout milking operations invariably send to the factory milk and cream of the highest quality irrespective of weather conditions.

If a definite cleaning system is followed and adequate facilities are available, it takes no longer to carry out the work thoroughly than it does to "slum" it and the cash return is higher.

Gassy Curd

It is not always possible to find by inspection of a plant and surroundings the cause of a defect arising from contamination, and inquiry may have to be made into the actual milking operations. At the factory curd from the milk from one supplier was found to contain gas. As shed and surroundings at the farm were clean the milking procedure was checked. Samples were taken from each cow in the herd of 100 and the milk placed in sterilised 4oz. bottles with rubber stoppers. The milk was kept overnight at the same temperature as that at the farm. Some samples of curd tested next day showed gas. At the shed water for washing the udders was becoming con-

MAINTAINING MILK AND CREAM STANDARDS . . .

taminated in the teat water tins, as it was not changed frequently enough during milking and udders were not being wiped dry. That this water was being drawn into the milk from the exterior of the udder when the teatcups were put on was proved when samples of good curds were taken from cows whose udders were washed immediately after the water was changed. There was no further trouble after it was ensured that clean water and cloths were used for washing udders and that they were wiped dry. A little Condys was also added to the teat water.

On another farm gassy curd was traced to curdy matter in caps of milk sight glasses. The machine was otherwise clean and after the caps were cleaned the milk was no longer graded second.

Grading Misunderstandings

The institution of Farm Dairy Instruction has helped to remove many misunderstandings between suppliers and factories on points of grading. Previously correspondence and complaints about grading or tests of cream occupied much of factory managers' and secretaries' time. Personal visits of instructors to farms has meant that many of these points are cleared up on the farm and those that reach the factory are immediately passed on to the instructor for attention. Instructors are also advised of the names of suppliers of inferior milk and cream and frequently the instructor visits the farm before the supplier receives the notice of low grade from the factory.

Improved Products

The improvement of sheds and milking plants as the result of Farm Dairy Instruction is reflected in the quality of butter and cheese. Cheese flavour is now much more uniform, particularly that made from raw milk, and the unclean flavours frequently in evidence have been considerably reduced. Butter is also much more uniform in quality as the result of the reduction in unclean flavours in cream.

The supplier of high-quality raw material must be given every protection and encouragement to maintain his efforts and the supplier of inferior milk and cheese must be encouraged to lift his products to the level of the best. The factory manager can encourage this by rigid adherence to the standard of grading set and close co-operation with the Farm Dairy Instructor and the supplier. If the grading is below standard, the suppliers of inferior cream may be getting a temporary benefit, but this will eventually encourage a drift to further inferior quality and a reduction in quality of factory output.

Answer to Correspondent

Warts on a Bull

Mr. R.T., Pahiatua:—

Would you please tell me how to cure warts on a yearling Aberdeen Angus bull. What is the cause of it and has it anything to do with his feed? Is it lack of lime? He has chaff, swedes, molasses, and bran when we can get it.

LIVESTOCK DIVISION:—

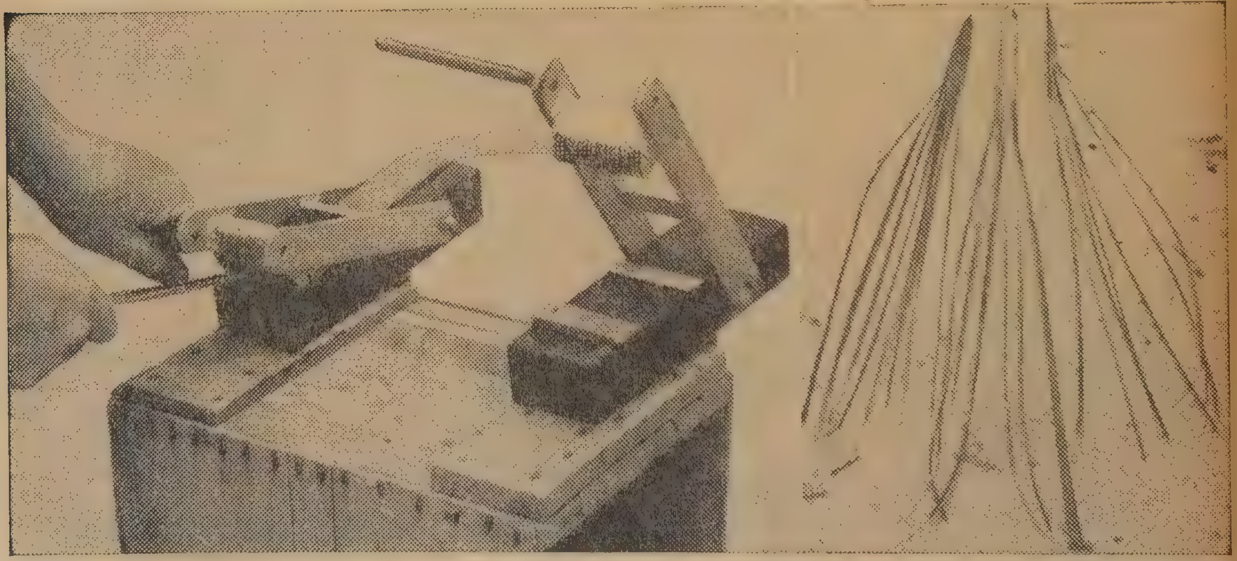
If there are only a few warts on the bull, they can be reduced by touching daily with glacial acetic acid, of which an ounce should be procurable from your chemist. First smear a little grease round the base of each wart, but not on it; use a small stick or feather to apply the acid and do not get it on fingers or sound skin of the animal.

If wart infestation is extensive, a simpler treatment would be to swab daily with castor oil.

The common type of wart on young animals is infectious; therefore the bull should have his own feed box, bucket, etc. In many cases the warts may disappear as an animal gets older.

Apart from the infectious virus, there is no knowledge of any factor, such as a deficiency, which leads to occurrence of warts. Young animals are probably susceptible and then develop immunity.

Orchardists' Labour Savers — A Flax Stripper



In market gardens, particularly those producing rhubarb, a large quantity of native flax (*Phormium tenax*) is used for tying bundles. A simple but effective and quick device for cutting the flax into suitable-sized strips has been constructed and patented by a Papanui grower. A blade of flax is inserted in the machine and pulled through with a quick movement of the arm. In the photograph on the left the machine is shown in operation and another machine beside it is opened to show the construction. On the right stripped flax is shown.

[*Green and Hahn photos*

A. R. GRAINGER,
Orchard Instructor, Christchurch.

Gid—A Comparatively Rare Parasitic Disease of Sheep

GID is a comparatively rare parasitic disease of sheep in this country. Its presence is of distinct interest to sheep farmers, who would be well advised to prevent the spread of the disease by taking the precautions advised in this article by A. G. Brash, B.V.Sc., Veterinarian, Christchurch.

THE cyst *Coenurus cerebralis* is found in the brain, and less frequently the spinal cord, of sheep and cattle, and causes the disease of sheep known as "gid" or "sturdy." Sheep are more often affected than cattle. The disease is fairly rare in New Zealand; it has not been reported in the North Island, and in the South Island it has been reported from various parts of Canterbury on not more than six occasions. The disease was diagnosed last July on a property in North Canterbury.

Life History

The life cycle of the disease is very similar to that of hydatids, a tapeworm in the small intestines of the dog again being responsible for the infection which causes the cysts in sheep. The tapeworm, which is called *Taenia multiceps*, is one of the large tapeworms of the dog, its length being from two to three feet. The mature segments passed in the droppings of the dog are about half an inch long. Each segment contains numerous eggs. If these are eaten by a sheep while grazing the embryos hatch out in the intestine and enter the blood stream. Those which reach the brain develop into the cyst *Coenurus cerebralis*. The cysts are fully developed in from six to eight months. Each cyst contains numerous tapeworm heads. When these are eaten by a dog they develop into adult tapeworms, thus completing the life cycle.

Symptoms of Gid

Symptoms of gid may develop in lambs seven months of age or older, or in adult sheep. Lambs may show the first symptoms as early as April, and 5 per cent. or more of a flock may be affected. Most sheep developing symptoms eventually die. The symptoms will vary in different animals according to the location of the cyst in the brain. The most common symptom is circling; the head is held to one side and the sheep turns in a circle towards the affected side. Many such sheep are blind in the eye on the opposite side. Other erratic movements may be caused by the pressure of the cyst on the brain. The head may be held down or pressed against an object. Periods of excitement and depression are frequent. Sheep may wander or run about aimlessly, or stand for long periods in one position. If the cyst is situated in the spinal cord, signs of paralysis affecting the hind quarters and legs may appear. The animals usually die in from one to two months after developing symptoms.

Diagnosis

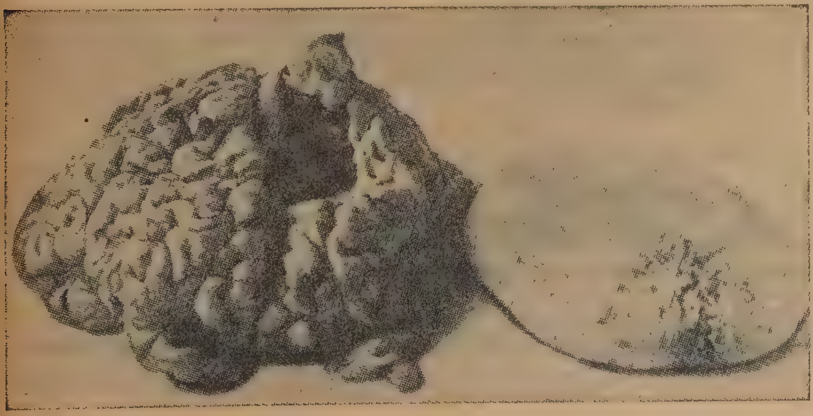
The only disease with which gid is likely to be confused is circling disease or listerellosis, the symptoms being very similar. The locality would act as a guide to some extent, circling disease being more common in the North Island, from which no cases of gid have been reported. Circling disease is due to an inflammation of the brain and its coverings caused by a micro-organism (*Listerella monocytogenes*). It occurs mainly in hoggets and younger sheep in the late summer from February to May. Sheep usually die within three to four days from first showing symptoms.

It is easy to differentiate between the two conditions by splitting open the skull and removing the two halves of the brain. The cysts which cause gid appear as bladders of watery fluid varying in size from a pea up to a hen's egg. On the wall of the cyst are numerous white spots about the size of a pin's head, each representing a larval tapeworm head. One or more cysts may be present, usually on the upper surface of the brain. In circling disease there are no gross changes in the brain and the typical lesions are revealed only on microscopic examination.

Contrary to popular opinion the larvae of the sheep nostril fly, *Oestrus ovis*, do not enter the brain cavity. The mature larvae, which are about half an inch long, are found in the sinuses or cavities of the skull in winter and spring. These sinuses communicate with the nasal passages but are separated from the brain by a wall of bone. The larvae may cause catarrh or sneezing, but would not give rise to symptoms similar to those of gid or circling disease.

Prevention of Gid

The same methods of prevention which apply to hydatid disease apply also to gid. Treatment of dogs with arecoline hydrobromide tablets, which removes the hydatid tapeworm, also expels the tapeworm *Taenia multiceps*, the cause of gid. When two dogs on the property previously mentioned were dosed numerous tapeworms of several species were expelled. These included many hydatid tapeworms and three specimens of *Taenia multiceps*. The second important preventive measure is that dogs must on no account be allowed access to the head or other parts of sheep which die of gid or are slaughtered when showing symptoms of the disease.



Coenurus Cerebralis affecting brain of calf.

SHEARING MACHINES

Bulletin No. 234, "Shearing Machines," will be of value to shearers and farmers with their own shearing plants. It gives a detailed description of the shearing plant, and the different handpieces used in New Zealand. This bulletin will teach the shearing machine owner how to maintain and repair his plant. This bulletin is available free from the Department of Agriculture, Auckland, Palmerston North, Christchurch, or Dunedin.

What's behind your door?

SACKS ARE VITAL TO FARMING

Because of crop failure, India has rationed the distribution of jute. This means that right throughout New Zealand there's a grave shortage of sacks and there is little hope of the position getting any better until our next shipment in September, 1947, UNLESS YOU DO SOMETHING ABOUT IT.

FIFTEEN MILLION BAGS ARE NEEDED FOR FERTILISER AND LIME. The avoidable wastage of sacks is enormous. Store sacks in a dry place until you can send them to your dealer. Look around the farm and root out those discarded sacks. If this season's fertilisers are to be distributed every spare sack in the Dominion must be collected.

Save those Sacks

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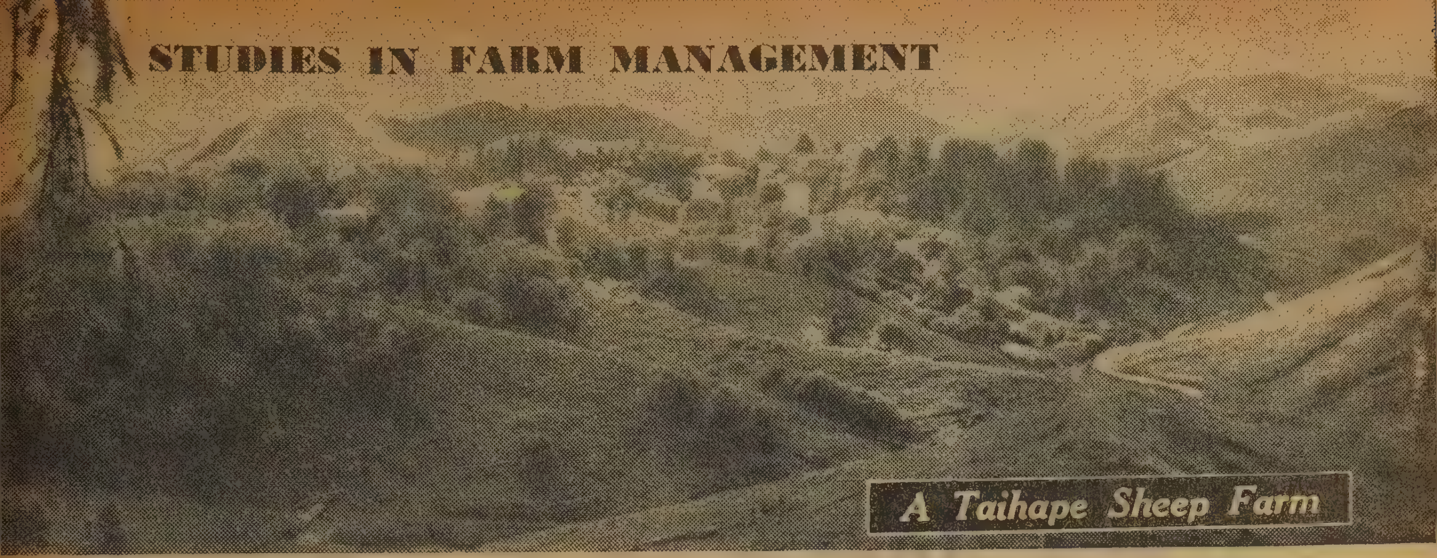
STUDIES IN FARM MANAGEMENT



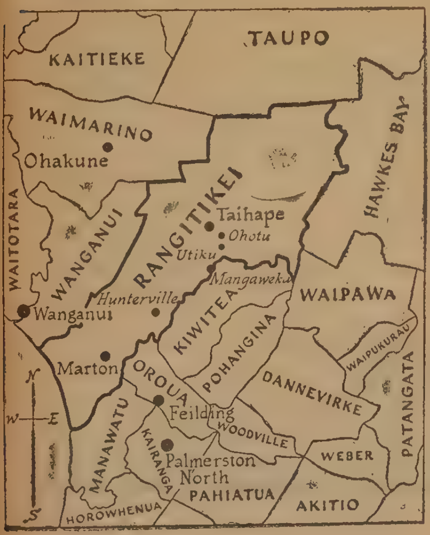
A Taihape Sheep Farm

THE thriving township of Taihape, at an elevation of 1450ft., 50 miles airline from the western coast and on the North Island Main Trunk railway, is the commercial centre of the northern sector of Rangitikei County. Its rural area extends northward to the high Central Plateau tussock country; westward to the Wangaehu River; eastward to the Ruahine Ranges, and southward to midway between Utiku and Mangaweka. Within these confines are some of the most prosperous and picturesque pastoral lands of New Zealand. Hill-country sheep farming predominates, and methods of management vary from extensive to semi-intensive according to climate and soil cover, as determined by topography, soil type, and altitude.

By **A. R. DINGWALL,** *Instructor in Agriculture, Wanganui.*

THE main topographical features range from rolling country through moderately steep to steep papa hills. The major soil types are the more fertile silt loams derived from underlying, sedimentary mudstones, and the derivatives of Tongariro and the less fertile Taupo volcanic ash showers at higher elevations.

Before the war the district absorbed annually 3000 tons of artificial fertilisers and less than 1000 tons of lime, but lime consumption increased to 2000 tons with the decrease in supplies of rationed fertilisers.



Taihape sheep, with their preponderance of Romney blood, are noted for consitution, quality of bone, and size. Cast-for-age ewes find a keen demand from Waikato and Hawke's Bay fat lamb raisers, and hoggets and white-faced ewe lambs are readily acceptable to coastal buyers. About 120,000 fat lambs, chiefly white-faced, are railed each year to the Imlay (Wanganui) and Longburn freezing works.

The district contains some noted Romney Marsh and Polled Angus studs.

Climate

The Taihape district, compared with many other North Island hill-country areas, has a comparatively low annual rainfall, averaging between 37 and 40in. However, it is fairly evenly distributed and, though the district is sometimes subject to dry periods during the late summer and autumn, conditions rarely become as severe as in Hawke's Bay and parts of the Wairarapa. Summer weather is usually equable, but the winters are somewhat severe because of the high altitude. From June to September frosts may be severe and snow may fall on as many as seven occasions, but except on the high tussock country these falls are light and quickly disperse.

A TAIHAPE SHEEP FARM

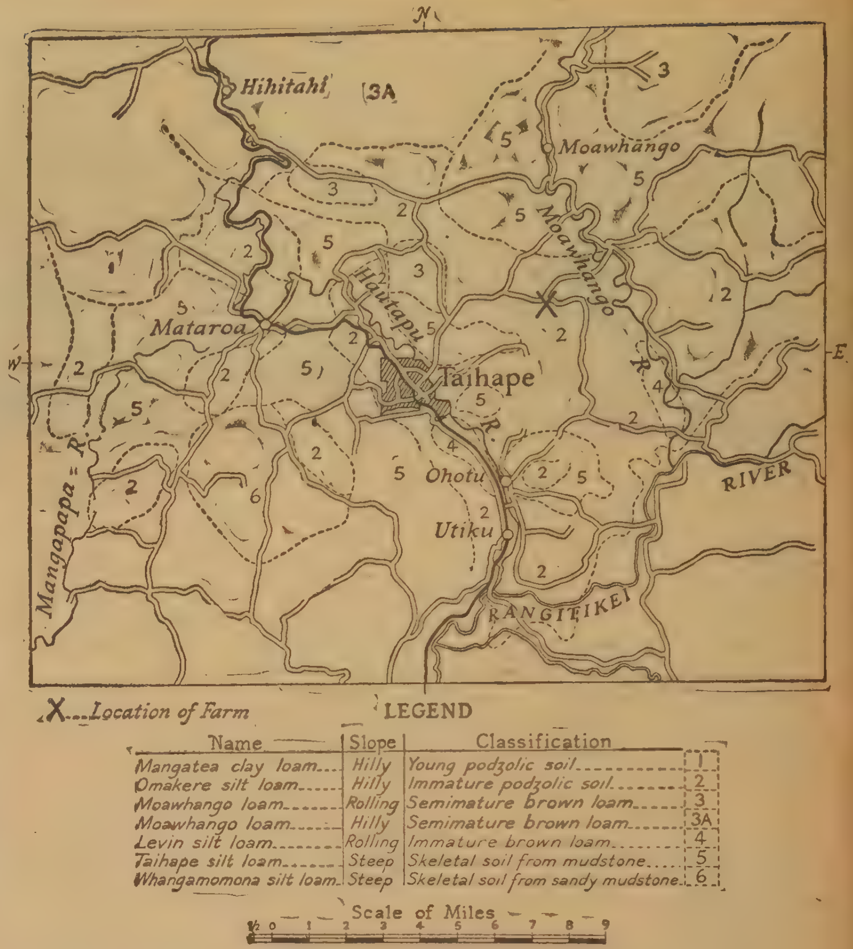
The farm which is the subject of this article is owned in partnership by Messrs. J. Bartosh and A. H. Doole, the senior partner, Mr. Bartosh, having been in occupation for the past 40 years. It is located as shown on the accompanying soil map, at Wainui, about 4 miles airline, or 6 miles via the Taihape Valley Road, to the north-east of Taihape. The area of 1405 acres includes an original block of 1150 acres acquired 40 years ago—950 acres of virgin bush and 200 acres of natural clearings; the other 255 acres is an adjoining block of natural clearing country acquired 20 years ago.

Development of Property

The original bush was dominantly matai and white pine with a good sprinkling of totara and maire. Light bush, existing on the fringes of the heavy bush and natural clearings, consisted mainly of lacebark, fuchsia, kowhai, matipo, and allied species. The natural clearing land, timbered in bygone ages, contained a cover of native grasses in which danthonia predominated, with some weed such as bidi-bidi and bracken fern.

Today the property consists of 1300 acres of fully-developed grassland, about 90 acres of native bush, 10 acres of exotic plantations and shelter belts, and the balance in residential and farm building sections.

Some 280 acres of natural clearing country has been ploughed, cropped, and sown down in the best English grassses and clovers. The steeper, surface-sown, bush-cleared hills are well clothed in pastures that contain a good proportion of the better-class grasses and have been materiallly improved by topdressing and judicious grazing.



LEGEND

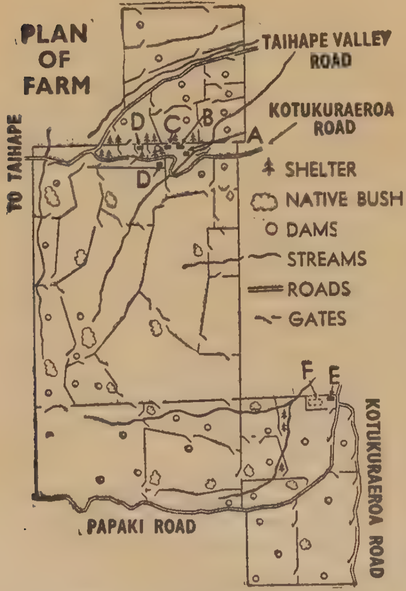
Name	Slope	Classification	
Mangatea clay loam	Hilly	Young podzolic soil	1
Omakere silt loam	Hilly	Immature podzolic soil	2
Moawhango loam	Rolling	Semimature brown loam	3
Moawhango loam	Hilly	Semimature brown loam	3A
Levin silt loam	Rolling	Immature brown loam	4
Taihape silt loam	Steep	Skeletal soil from mudstone	5
Whangamomona silt loam	Steep	Skeletal soil from sandy mudstone	6

Numerous patches of native bush, thoughtfully preserved, not only "lend enchantment to the view" but provide shelter and shade for stock and have a stabilising effect on the steeper hill soils.

Topography and Soils

There is virtually no flat land, the area consisting chiefly of moderately-steep hills, of comparatively smooth contour, rising from about 2000ft. to 2432ft. at the Matangawha Trig. Apart from some sloping toplands, the ploughable country is rolling. Most of the hill country is in well-defined ridge systems, but some lesser peaks rise as isolated, symmetrical cones, a characteristic land formation found throughout the more massive hill structure of the Taihape district.

The soil type is fairly uniform, being a strong silt loam of good depth overlying the sedimentary mudstone (papa) from which it has been derived. It is typical of soil type No. 2 on the accompanying soil map, occurring extensively throughout the district. It is one of the best classes of hill-country soils to be found throughout New Zealand. Soil type No. 5, which also occurs extensively in this locality, is of somewhat similar origin and type, though the topsoil is shallower and the hills more steep and rugged. The black topsoil is inclined to pug during the winter, probably because of a prolific population of earthworms, which are strongly established throughout much of the country. This tendency to pug is not so pronounced as in the soils of some adjacent steep papa country, and on the ploughable, rolling areas excessive pugging can be overcome readily by mole drainage.



A—Homestead. B—Stables and implement shed. C—Woolshed, yards, and covered dip. D—Cottages. E—Whare. F—Sheepyard.

Though the moderately-steep slopes are subject to slip erosion of the less severe kind, the establishment and maintenance of close ground cover, as provided by a dense, vigorous pasture sward such as that on this farm, have an important influence in the mitigation of soil erosion. Furthermore, when slips do occur in this country they readily regrass if the original sward was of reasonable quality, though Messrs. Bartosh and Doole hasten the process by surface sowing.

Subdivision

The property is closely subdivided. Internal fence lines may appear irregular, but fences have been constructed on the sound principle of conforming to the lie of the land and are mainly located along ridges. All fences are substantially erected and well maintained. Barbed wire is not favoured because of possible injury to stock. The fencing programme, in both construction and maintenance, has been facilitated by readily-available supplies of timber from the original forest cover and the plentiful reserves, particularly of totara, that were wisely retained while the farm was being developed. These reserves are now near exhaustion and are being replaced by materials drawn from long-established plantations of exotic species, particularly macrocarpa and eucalypts.

Paddocks range in size from one acre, in some of the homestead fields, to 150 acres for the larger subdivisions.

Water Supply

In common with many others throughout the Taihape district, this farm is not favoured by a plentiful and permanent supply of running water. With close subdivision, few paddocks contain permanent streams. During the drier summer months the lack of water, especially for cattle, is a limiting factor in this country, and special provisions have to be made to overcome this difficulty.

This drawback has been efficiently surmounted by Messrs. Bartosh and Doole, who have constructed numerous small earthwork dams to cater for all paddocks not served by permanent streams. These dams, of which there are 40, each about 3ft. deep and 1 square chain in area, located as shown on the farm plan, were constructed with horse scoops. Today they could be formed more easily by a bulldozer. In general, they are sited to avoid the major depressions, where rapid silting up would be most likely in the larger, though non-permanent, streams.

The winter rainfall is sufficient to ensure the filling of these dams, even though they do not gain the full benefit of the whole of the potential catchment area. The time and labour expended in their construction have been adequately compensated for by the vital service they perform.

Water for the homestead, adjacent cottages, woolshed and dip, and also for some of the homestead paddocks, is provided by four circular concrete tanks holding 48,000 gallons, and ranging in size from 5000 gallons to one of 23,000 gallons at the woolshed. Every advantage has been taken of the extensive catchment areas of homestead and farm building roofs to collect the rainwater with which these tanks are filled.

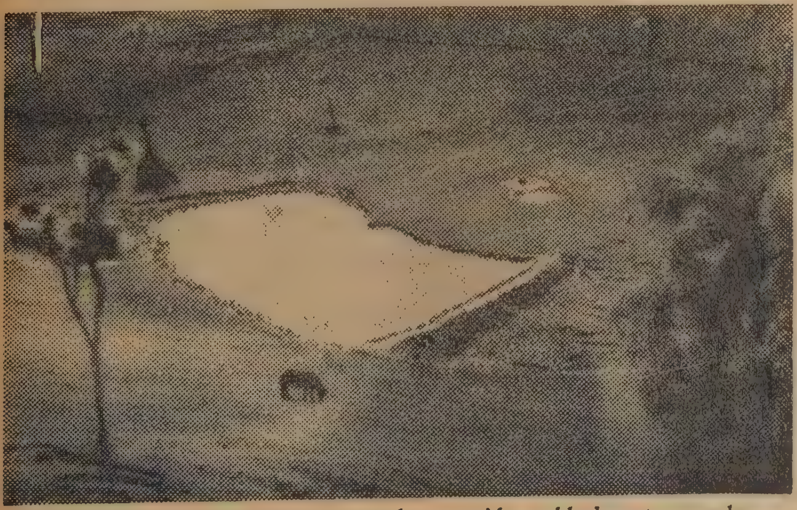
Buildings and Equipment

Of the residential buildings, the homestead (A) with its well-planned gardens, lawns, and shrubbery is pleasantly enclosed by a high, close-clipped macrocarpa hedge, belts of splendid eucalypts and pines, and a grove of native bush containing many kowhais. The concrete drive winds up from a cattle-stop entrance on the Kotukuraeroa Road.

The homestead.

Two cottages (D) are near the homestead, one on a rise opposite the home entrance and the other in the sheltered valley below. Further staff accommodation is provided by four-roomed shearers' quarters (not shown on the plan) below and to the south of the homestead, and a whare (E) on the south-eastern sector of the property.

The farm buildings include a four-stand, electric-powered woolshed with night accommodation for 1000 sheep, with adjoining yards and covered, tip-platform dip. The stable and implement shed (B) is above the woolshed, and another store shed (not shown on the plan) stands between these two. Pens and a ramp to facilitate the loading of sheep are on the roadside near the woolshed. Sheepyards (F) serve the southern sector of the property.



One of the small artificial dams that provide paddock water supply.

In addition to the usual cultivating equipment, the farm carries a full complement of horse-drawn haymaking machinery including mower, tedder, rake, tumbler and wheeled sweeps, and a mechanical stacker.

Plantations and Shelter

The general formation of the country, with its sunny gullies, sloping valleys, and the protection of intervening ridges, lends itself to natural shelter so that extensive shelter belts are necessary only in the vicinity of the homestead. Patches of native bush, where in September kowhais bloom in profusion, provide protection and shade for stock in most of the outlying paddocks. Thus, though there are one or two high shelter breaks, mainly of pines, most of the exotic trees have been planted in the form of small mixed plantations begun 30 years ago. The species used include macrocarpa, *Pinus insignis*, and several varieties of gums, notably *E. Macarthurii, E. viminalis, E. Gunnii, E. saligna,* and *E. botryoides.* All, with the exception of *E. saligna* and *E. botryoides*, have given satisfaction, and there are some splendid 30-year-old insignis pines, as straight as a gun barrel to 90ft. at the tips, and 8ft. 6in. in circumference at the butts. Eucalypts, after 30 years' growth, have attained a height of over 80ft. with a butt circumference of over 6ft. and little sign of faults. Macrocarpas are already providing fencing posts, and much fencing material in the way of posts, battens, and rails has been taken from thinnings of plantations.

A small stand of redwoods is of too recent origin to indicate results.

Shelter belts have been planted as three-row breaks with 8ft. between trees and 10ft. between rows. In mixed belts gums and *Pinus macrocarpa* the gums have been placed on

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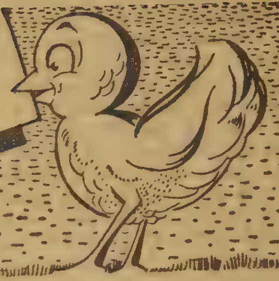

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the leeward side. The 10ft. spacing between rows has been found a little too close for these mixed plantations.

Mr. Bartosh is a firm believer in intercultivation at least during the initial year of establishment. Young trees set out and intergrown with a potato crop in the first year have attained a height of 10ft. by the following autumn, and Mr. Bartosh considers that by this intercultivation young trees gain 3 or 4 years of growth. The best timber has been grown in the valleys.

Pasture Mixtures

Pastures, whether on the easier, ploughed country or on the moderately-steep hillsides, form close swards in which the better classes of English grasses and clovers, particularly perennial ryegrass, cocksfoot, and white clover, are conspicuous. One outstanding feature is the very considerable proportion of cocksfoot in these pastures and its vigorous appearance even in July.

The value attributed to this species, and to the advisability of a heavy seeding rate of quality seed when sowing down permanent pasture, can be gauged by the following mixture used in all recent sowings.

	lb. per acre
Perennial ryegrass, Certified Mother seed	36 - 38
Cocksfoot, Certified	16 - 14
Crested dogstail	4
Timothy	1
White clover, Certified	3
Total	60

Where soil conditions are damper the lower seeding rate of cocksfoot is used, timothy is omitted, and the mixture made up to the 60lb. an acre by including 3lb. of meadow foxtail. Cowgrass was used in earlier sowings and succeeded very well in the original bush burns. As red clover tended to graze out, and the balance of clover in the sward could well be maintained with white clover, its inclusion was discontinued. The more recently-introduced and persistent strains of Montgomery red clover have not been tried.

Both spring and autumn sowings have proved successful, though autumn sowing is favoured, especially in weedy ground where thistle, fat-hen, and black nightshade prove troublesome in spring sowings. Early ploughing and pre-cultivation to control weed growth and attain the desirably fine tilth is deemed advisable to ensure the establishment of a dense, vigorous sward.

On unploughable country the sward has been improved by surface sowings of the same mixture, though at a lighter seeding rate. Where possible heavy harrowing before surface sowing is recommended.

The pastures are never severely grazed and are kept in order by cattle grazing, topdressing, and liming.

Topdressing and Liming

Mr. Bartosh was a pioneer in the topdressing of hill country in the Taihape district and began the use of artificial fertilisers for this purpose some 20 years ago. During his initial trials in conjunction with the Department of Agriculture various phosphatic fertilisers, including superphosphate, rock phosphates, and basic slag, were used both alone and in combination. Basic slag gave the most lasting effect, but experience indicated that best results could be obtained by a mixture of superphosphate-Nauru-potash in the ratio of 2:2:1; this mixture, applied at 3cwt. an acre, was used whenever these materials were available.

In a three-year period, during which practically the whole of the property received a dressing, wool production was raised from 68 to 112 bales a year. Fertiliser rationing prevented the continuance of a programme of topdressing one-third of the farm annually.

Similarly, wartime difficulties interrupted a liming programme that would have given the property a dressing of 2 tons of agricultural lime an acre. Phosphates have been found to give an added response when applied after the liming of this country.

With ample road access and an easy terrain compared with much other hill country, the laying out and distribution of fertilisers and lime offer no great difficulty on this property, though all spreading has been done by hand.

Cropping Programme

Till recent years between 30 and 40 acres were cropped and from 20 to 30 acres of grass were cut annually for hay. The crops grown were rape for autumn fattening, swedes for winter roots, and from 5 to 10 acres of oats for chaff which was used on the farm for the horses. High yields of swedes can be obtained on this country; one exceptional crop yielding about 100 tons an acre was grown as a first crop after an area of rush-infested land had been deep ploughed and mole drained.

Mole drainage proved so successful on some of the ploughable, rolling country in eliminating both rushes and winter pugging of the soil that about 100 acres were treated. These drains are still working satisfactorily after 10 years' operations.

Labour shortage during the war led to the abandonment of cropping and a reduction in the area cut for hay to 10 acres a year. Apart from some concentrate feeding of stud ram hoggets and the feeding out, mainly to cattle, of the present reduced tonnage of hay, all animals are wintered on grass alone.

The hay is not baled, but is fed out either in racks or in the field, the latter method being preferred because of the benefit conferred on pastures by the feeding out of well-seeded hay.

Secondary Growth and Weed Control

On this property such common secondary growth as manuka, bracken, and hard fern, and that troublesome sheep-country weed bidi-bidi, is absent. Yet all are to be found, sometimes extensively, on farms where soil type, topography, and climate are similar to those of this farm. The remarkable cleanness of the pastures may be attributed in no small measure to the wise policy of dealing effectively with these invaders before they had a chance to become established strongly. Two patches of manuka, totalling 3 acres and growing on the natural clearing area of the original block, were cut, carted into a gully, and burnt 30 years ago and have not reappeared there since. Similarly, 8 to 10 acres of the more recently-acquired natural clearing were invaded by manuka. It was treated in similar manner, the area surface sown, topdressed, and stocked with cattle, and the dense pasture sward is now free of this trouble, in marked contrast to nearby natural clearing country.

Bidi-bidi which originally infested the natural clearings was cleaned up by allowing the growth to come away in the autumn, followed by heavy grazing by cattle from April to September. No further trouble has been experienced from this weed.

It is stressed that successful eradication of bidi-bidi can be achieved only by heavy stocking with cattle during the winter and by the maintenance of a close pasture sward. The same applies to the control of bracken fern.

Stock Management

At present the 1300 acres of grazing land winters 3760 sheep and 600 cattle, the cattle being increased to 800 during the summer by buying in yearlings in the spring.

The sheep flock includes 2000 breeding ewes, 1600 hoggets, and 60 rams. The high proportion of hoggets to mature sheep arises from the fact that a substantial Romney stud — the

General view of part of the station.

Kotuku Stud, established in 1913 and considerably increased during recent years—is maintained. The wintering of a large number of stud hoggets lowers the potential ewe-carrying capacity.

All replacement sheep are bred on the property. Ewes are ring crutched before tupping. In the case of the flock ewes, most of the rams are put out on March 20, but a few are retained to go out about four weeks later. Rams remain out until crutching time. Fresh rams are introduced into the stud flock at intervals of three weeks.

After being crutched in June the ewes are drafted out, according to age, into the paddocks in which they will lamb. The owners would prefer to draft out flock ewes and lambs at drop on to fresh pastures, but the present labour position precludes this except with the stud flock. Lambing usually begins about August 20. Percentages, based on the number of lambs dropped and the number of ewes mated, range between 110 and 120, and losses, which occur mainly at lambing time, are light—5 per cent.

No fixed rotational grazing system is adopted, nor is any special provision made for spring feeding apart from the closing up of two or three small grass paddocks for a reserve in case of emergency. The rotation system was tried out several years ago on a specially-subdivided portion of the farm. Though no difficulties were encountered, it did not appear to offer any advantages over the present system, whereby the ewe and lamb flocks are shifted only occasionally to take advantage of fresh feed offering in any particular paddock.

Docking is begun at six weeks to avoid the disadvantages arising out of mismothering when lambs are docked at an earlier age. Shearing is done during December, and all lambs are shorn with the ewes to lessen the incidence of blowfly strike and reduce the labour involved in the dagging of woolly hoggets. All flock wether lambs (white face) are sold fat off the ewes, and surplus flock ewe lambs are disposed of at the local autumn fairs. Lambs are drenched at weaning and again about eight weeks later if deemed necessary. Replacement ewe hoggets are turned out for the winter into paddocks known to do hoggets well, though apart from this no special provisions for feed are made. Stud ram hoggets are fed a rationed supplement of mixed concentrate meals and nuts which has been found very beneficial. The incidence of hogget mortality is insignificant.

Two-tooths are culled for constitution and to a smaller extent for wool defects, all stud animals being subjected to the wool type test conducted by Massey Agricultural College at Palmerston North. In addition to the culling of two- and four-tooths, all five-year-old ewes are sold at the local February ewe fairs.

Contrary to the more common practice, little culling of dry ewes is done. If the condition of these ewes is kept down during the summer, it has been found that they produce really good lambs in the succeeding year, and it has been concluded that only a very small proportion of ewes will not breed.

Foot-scald gives more cause for concern than foot-rot on this farm, and as a precaution the flock is run through the foot-rot trough whenever mobs are yarded.

No cattle are bred on the property and all purchases, most of which are made privately and preferably from regular sources, are of young stock, seldom more than yearlings. They are used principally for keeping pastures in order by preventing excessive growth, and mobbed and shifted accordingly. In the autumn the tops are quitted to the works as light chillers and the remaining surplus sold in forward condition at the autumn cattle fair. All animals are sold at 2½ years old. Polled Angus or Polled Angus-Hereford cross steers are preferred, but occasionally lines of pure Herefords are run.

Wool Production

Between 1930 and 1936, and before the reduction in the ewe flock with the expansion of the stud flock, the yearly production of wool ranged from 122 to 134 bales. The more recent range is between 120 and 122 bales averaging 440lb. Lambs shorn in December average 3lb. a fleece, hoggets (shorn as lambs) average 13¼lb., and the ewes clip an average of 14lb. All fleeces are skirted, and before the introduction of the wartime appraisal system the wool was classed in the shed. Classing will be reintroduced in future clips.

Acknowledgments

Thanks are expressed to the Soil Survey Division of the Department of Scientific and Industrial Research for data in the soil map and to the Lands and Survey Department for drawing of maps.

Pig Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in December as under:—

Auckland—1YA, on December 18, at 7.15 p.m., "How Pig Clubs and District Pig Councils Can Help You," by W. C. Wallace, Supervisor, Waikato District Pig Council.

Dunedin—4YA, on December 19, at 7.15 p.m., "The Creep and its Special Purpose," by N. McDonald, Supervisor, Otago District Pig Council.

Palmerston North—2ZA, on December 20, at 7 p.m., "Pigs for Profit," by L. L. Marsden, Supervisor, Wellington District Pig Council.

Napier—2YH, on December 10, at 7.15 p.m., "Feed Supplies for Second Litters," by H. Hopkins, Supervisor, Tairawhiti District Pig Council.

NEW ZEALAND POULTRY FLOCK IMPROVEMENT PLAN

By F. C. BOBBY, *Superintendent of Poultry Husbandry, Wellington.*

THE time has again arrived for poultry farmers to apply for accreditation under the New Zealand Poultry Flock Improvement Plan. The pamphlet setting out the conditions under which the plan will operate in 1947 is now available, together with the necessary application form. Poultry farmers should note that applications are required to reach the Department in Wellington by November 15, but a reasonable tolerance will be permitted. It is therefore an appropriate time to review the work that has been done in connection with this plan, to restate its objects, and to discuss the amendments included in the conditions for 1947.

BOTH the New Zealand Poultry Board and the Department have always recognised that spectacular results could not be expected in the initial years of the plan, but the results to date have been well up to expectation if the position is viewed on a Dominion basis. Some provinces have shown a more lively interest than others, and the number of flocks accredited varies considerably as between the larger poultry-producing areas. The plan enters upon its third year in 1947, and it is satisfactory that there is no apparent falling off in the interest shown by poultry producers. Any new scheme invariably meets with the maximum of interest at the start as something new, but such interest can and often does fall away as this newness wears off. This is the critical period for any such project and the time when its soundness or value is tested.

Since the inauguration of the plan it has been obvious that a large number of poultry farmers are agreed that a plan for the improvement of the poultry-breeding stock in the Dominion is of paramount importance. There has, in fact, been little criticism of the objects of the plan, but there has inevitably been some criticism of the conditions laid down so far, while there are some who do not consider that the plan is sufficiently comprehensive. Before commenting, however, upon the amendments to the conditions set down for 1947 and the more serious criticisms of the plan to date, a brief review of the results obtained will be set out. A comparison of results during the first two years—1945 and 1946—on a Dominion basis illustrates the advance that has been made so far:—

	1945	1946
Number of flocks accredited	28	71
Number of female breeders accredited	5,358	15,428

These Dominion totals broken down into provinces supply data of further interest:—

	1945	1946
Auckland (including Whangarei, the Waikato, and East Coast):		
Number of flocks accredited	3	6
Number of female breeders accredited	449	1,683
Wellington (including Taranaki, Manawatu, Hawke's Bay, Gisborne, Blenheim, and Nelson):		
Number of flocks accredited	13	41
Number of female breeders accredited	1,607	7,378
Canterbury-Westland:		
Number of flocks accredited	3	6
Number of female breeders accredited	1,103	1,956
Otago-Southland:		
Number of flocks accredited	9	18
Number of female breeders accredited	2,199	4,411

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The considerable room for an increase in the figures for Auckland and Canterbury-Westland before these two provinces come into line with the other poultry centres has been noted by the Department and the Poultry Instructors in the two provinces concerned have been requested to concentrate upon obtaining further support for the plan.

Two other aspects of the plan in which interest is evinced—how many birds of breeds other than White Leghorns have been accredited and to what extent breeders are accrediting pullets—are illustrated in the following figures:—

	No. of White Leghorn female breeders accredited.		No. of other breed females accredited.		No. of pullets accredited.		Per cent. pullets of all females accredited.	
	1945	1946	1945	1946	1945	1946	1945 per cent.	1946 per cent.
Auckland	449	1,628	—	—	—	106	—	6.5
Wellington	1,540	6,169	67	1,209	128	562	7.9	7.6
Canterbury-Westland ..	1,103	1,956	—	—	—	—	—	—
Otago-Southland	2,199	4,411	—	—	—	—	—	—
Dominion	5,291	14,164	67	1,209	128	668	2.4	4.7

The above figures indicate a healthy rise in the number of birds accredited other than White Leghorns. The figure of 1,209 for 1946 is made up of Black Orpingtons only. The number of pullets used for breeding remains small and the mating of pullets is entirely confined to the North Island.

CRITICISMS OF THE PLAN

No plan of this kind could be established under conditions which would meet with the approval of all poultry breeders. Some of the criticism has been of little value or interest, but much has been of a helpful nature and will in time result in amendments to the conditions which will undoubtedly strengthen the structure of the plan. It may be helpful to comment on at least a representative sample of the criticism, and for the sake of simplicity points raised will be listed under separate headings.

Minimum Weights

The minimum weights at which any bird, male or female, according to breed, may be accredited have undoubtedly been the most contentious subject in the plan, and much more will be said and written before weights are arrived at for both heavy and light breeds which are acceptable to the majority of the industry. The time of the year at which these weights are taken and the condition of the birds are closely influencing factors.

When fixing these minimum weights the New Zealand Poultry Board and the Department agreed that it was desirable to avoid setting a standard that differed from the New Zealand Utility Poultry Standards as laid down in 1934. It was felt that the setting up of two standards was definitely undesirable, particularly as the New Zealand Utility Poultry Standards and the New Zealand Flock Improvement Plan are both designed to maintain the quality of poultry in the Dominion. The committees dealing with the plan since its inception and set up to advise the Poultry Board have been concerned with maintaining a high standard. The basic policy has been that the breeder should raise the quality of his stock to the standards laid down by the plan and not to lower the standards of the plan to assist greater numbers of lower-quality birds to become accredited. Thus it has been widely contended that the minimum weights set were too high—an example of the old controversy of size of bird and egg production upon which much has been written without settling the point.

After two years' experience of the plan it has been decided to lower the weights required for heavy breeds under the conditions for 1947. Arrangements are being made for the New Zealand Utility Poultry Standards to be reviewed and revised if necessary by a representative committee early in 1947, after which the conditions for the plan for 1948 will be framed in the light of the new Utility Poultry Standards.

The question of lowering these weights was given careful consideration, and it was decided that a reduction could be made in the interests of egg production without detriment to the quality or the fitness of a bird to be a breeder. No alteration was made for light breeds, but it is inevitable that this point will be raised again before 1948.

It must be stated again that the Department is not prepared to accept the responsibility of individual Poultry Instructors being permitted to exercise their discretion regarding minimum weights of birds to be accredited. This would lay an instructor open to unfair criticism if it were alleged that he was not consistent, quite apart from the fact that instructors in some districts might be said to be more lenient regarding minimum weights as compared with those in other districts.

Blood Testing

The blood testing procedure has generally brought little criticism. All applicants for accreditation cannot have their birds tested at the same time or within a short period. Those who through force of circumstances have been left to the last have expressed concern and dissatisfaction. Officers of the Department, however, have now gained experience in planning this accreditation work and there are more officers available to carry out this work in 1947.

One amendment has been made to the conditions for the pullorum disease test. A flock cannot be accredited unless the female breeders show less than 6 per cent. reactors to the test. Previously the 6 per cent. referred to both male and female birds. So few reactors are found among male birds that their inclusion could substantially reduce the overall percentage of reactors in a flock of breeders. It has been decided to strengthen this safeguard under the plan by ensuring that less than 6 per cent. female birds were rejected for a pullorum disease reaction.

Accreditation Notifications

A number of applicants for accreditation have complained of the delay in receiving notification from the New Zealand Poultry Board that their flocks have been accredited. All associated with the administration of the plan appreciate that it would be of value to poultry breeders to know at an early date and well before the breeding season that their flocks have been accredited. It will be generally conceded that all notifications must be sent out on the same date unless some breeders are to have an advantage over others. The last practical administrative work before accreditation can be completed is the inspection, weighing, blood testing, and leg banding of cockerels and pullets, which cannot be completed in all districts until well into June. Thus notifications of accreditation cannot go out until July.

Leg Bands

In the first year of the plan the Department had to mark the wings of accredited birds with a dye, which was, of course, purely a temporary measure, and in 1945 an aluminium leg band manufactured in New Zealand was used. It carried the letters N.Z.A.F. (New Zealand Approved Flock) and the year 1945. Information has recently reached the Department indicating that these leg bands are not entirely satisfactory, as instances have been reported where the bands have snapped and come off birds' legs, and enquiries have been made regarding the possibilities of obtaining leg bands from overseas. Trouble of this kind is obviously of a temporary nature, since when conditions again become normal there will be little difficulty in obtaining a satisfactory band for this purpose.

POULTRY FLOCK IMPROVEMENT PLAN . . .

Present and Future Objects

Few, if any, poultry producers interested in the welfare of future poultry stocks have criticised the present main object of the plan—to maintain and, if possible, improve the health and constitution of poultry in the Dominion. There are some, however, who wish to see the plan go further in its objects and embrace egg production. The Department supports this view, but is forced to recognise that any step in this direction will bring in its path many practical administrative problems.

The possibility of including some form of recording egg production was considered when the objectives and the conditions under which the plan would operate were first discussed, but it was decided that the plan should become established before this particularly difficult problem was tackled. Furthermore, the Department indicated at that time the impossibility of providing sufficient officers to control the investigation and recording of egg production. Additional Poultry Instructors have since been appointed in both islands, and the Department is prepared to consider any proposals put forward by the industry for extending the present scope of the New Zealand Poultry Flock Improvement Plan.

It must be stressed that there are still a number of poultry producers who think that it should be possible to lay down conditions which would prevent any accredited breeders under the plan from committing any act prejudicial and contrary to the spirit and letter of those conditions. This has never been achieved in any other poultry-producing country where a plan of this kind is in operation and will not be achieved in New Zealand. It is a weak and defeatist attitude to state that because this complete control is not practical it is useless to run any plan of this type. If egg recording in any form is introduced while efficient checks can be carried out by controlling officers, there cannot possibly be any control which could be claimed as completely watertight. This matter will have to be considered by the industry, but a spirit of co-operation and trust is the first essential in any scheme of this nature.

Present Food Difficulties

A limited number of poultry producers appear to feel that support for the Poultry Flock Improvement Plan is of little consequence while food shortages and egg prices are of paramount importance. It is not difficult to appreciate why food difficulties and costs of production are uppermost in poultry producers' minds at the present time. On the other hand, never before has it been more important to maintain only healthy and economic producing stock. Every ton of food available should be used to the greatest advantage, and the higher the standard of the stock on the farm the more economic will be the cost of production. Heavy wastage in mortality and culls from stock of unsound constitution must reduce the efficiency of flocks and add substantially to the cost of production. The New Zealand Poultry Flock Improvement Plan was established to raise the standard of New Zealand poultry flocks, and it should play an essential part in assisting poultry producers under present-day difficulties.

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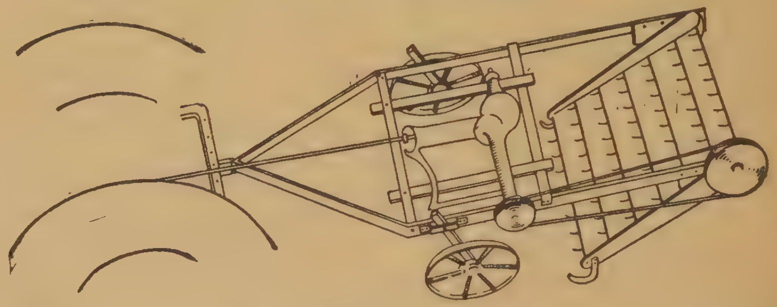
Device for Lifting Clover Swaths

By E. C. WITHELL, *Fields Instructor, Rangiora.*



CROPS of clover looked exceptionally well in North Canterbury early last season. Frequent showers induced a dense growth and good yields were confidently expected. However, the weather was exceptional after most of the crops were mown, and as the weeks passed hopes of heading the clover grew less. Beaten down by heavy rain, the swaths left by the mower could not dry out in the short periods of good weather, and to make matters worse grass and clover began to grow through them.

IN an endeavour to condition it for heading, some farmers turned the clover by hand; others mowed under the swaths to free them from second growth and to lift them off the ground. A North Canterbury farmer realised that an implement was required that would lift the swaths carefully and lay them lightly on the stubble where, in the sun and wind, they would dry out quickly. With commendable zeal he set to work to make one.

With the gearbox and axle of an old mower, the frame and wheels of an equally old stiff-tined grubber, and the pick-up attachment of his header, he improvised a machine that enabled him to harvest his clover. Whenever the weather was favourable he used this machine to lift in the morning just as much clover as he could head in the afternoon.

Here is a brief description of the machine:—

The grubber frame was inverted and the wheels moved to the forward end; two plates were bolted to the rear ends of the frame to hold the spindle of the pick-up attachment; two four-by-twos, attached to the frame, carry the inverted gearbox and axle of the mower.

The bevel pinion was riveted to the axle and some of the gears were eliminated. The power drive shaft, connected to the pitman shaft of the mower, turned the mower axle and a pulley fixed on the end of the axle. A belt from this pulley drove the pick-up attachment. The pick-up attachment can be transferred quickly and easily from the header to the machine and vice versa.

The total cost was £3 for the two plates and an adjustment to the power drive shaft.

WINTER FEEDING OF EWES AND SUMMER FATTENING OF LAMBS IN CANTERBURY

* *By* T. K. EWER, *Veterinary Research Officer, Christchurch.*

EXTENSIVE field observations during the widespread and serious mortality which occurred among sheep throughout Canterbury in 1937-38 indicated that, while a high worm infestation was frequently associated with this fatal condition and the number of lambs dying from enterotoxaemia also increased during this time, there were many indications that unknown factors, probably associated with the feed itself, were playing a part and certainly demanded investigation. To attempt to elucidate these problems was the primary purpose for commencing investigations at the Kirwee Experimental Farm in 1940. There has been no serious recurrence since of the mortality referred to, but the experiments conducted on the farm have yielded some valuable information on the winter feeding of ewes, the summer fattening of lambs, and the winter feeding of hoggets in Canterbury, which is recorded here by T. K. Ewer.

MOST breeding ewes in Canterbury are of the half-bred, threequarter-bred, or Corriedale type, and Corriedale ewes have been used in the feeding trials at the Kirwee Experimental Farm since 1940. During the first two years 4- and 5-year-old ewes formed the experimental flock, but in 1942 about 380 two-tooth ewes were bought and these have been used each winter since. The treatment given to each group of between 50 and 60 ewes into which they were divided has remained roughly the same, for in this way the residual effect of preceding seasons could be more easily observed.

Although the farmer is anxious to have healthy, strong ewes, he is in most cases primarily interested in the number and weight of the lambs produced by these ewes and in the proportion of lambs which reach freezing weight before weaning; therefore, in addition to studying the effect of different winter feeds on the ewe weights, it has been the practice at the Experimental Farm to follow on with observations on the growth and disposal of the lambs.

It is an old-established practice throughout Canterbury to grow special feed crops for ewes during the winter. For very many years turnips were the most popular, but because of the increasing severity of insect attacks, as well as the chancy nature of the crop through weather irregularity, an increasing number of farmers of recent years have turned to the growing of bitter blue lupins, either with or without Italian ryegrass or oats. In the same way chou moellier has become very much more widely grown.

Another line of inquiry was whether the results from feeding ewes through the winter on pastures of different age and type would be comparable to those from specially-grown feeds, and each year groups of ewes have been placed on the following feed treatments:—

1. High plane:

Lupins (bitter blue) generally sown with Italian ryegrass or oats.

Italian ryegrass either with or without red clover, grown in the same paddock as the lupins to afford a direct comparison.

Oats.—An area of green oats (Algerian) was grown for four consecutive years to test a widely-held view that ewes and lambs cannot safely be left on this feed.

Chou moellier has been grazed alone and with hay supplement.

Turnips have been grown twice for ewes and conditions happened to be favourable each time.

Pasture. — Autumn-sown pasture which has consisted of improved Certified perennial ryegrass, either alone or, since 1944, sown with an equal quantity (15lb. of each per acre) of H1 (short-rotation) ryegrass plus 6lb. mixed clovers per acre.

2. Medium plane:

Good average old pasture with a hay supplement.

3. Low plane:

Poor, run-out pasture, with a small ration of hay.

The procedure has been to let all the ewes run together from weaning time, in early January, until the rams were taken out toward the end of May. After weighing, they then went on to their different winter feed treatments.

Results

1. High plane:

Lupins.—The bitter blue variety has been used, except during 1943, when sweet blue lupin was used. Sown at the rate of 1½ bushels an acre, this feed has grown well in a variety of differing seasons, and, apart from 1940, when mature ewes were put on for the first time in their lives, no difficulty has been found in getting the sheep to eat them quite readily.

Fig. 1 shows that the ewes wintered on lupins have made as good gains in weight as any group through the winter. Observations were made over several years to see if better results would be obtained by growing lupins with Italian ryegrass or with Italian ryegrass and red clover, but no difference was demonstrable.

Turnips.—This crop was fed to the ewes during two winters, but the heavy fall of snow at the end of July in 1945 came at such a critical stage of the experiment that that year's work was invalidated. Consequently the most that can be claimed is that as long as the crop is a good one and heavy snowfalls do not occur, ewes will do as well on turnips as on any feed. But since experience has shown how comparatively difficult it is to be in any way certain of the crop, it is not surprising that there is a widespread tendency to depend less upon turnips in Canterbury.

Chou moellier.—There has been a notable increase in the area sown to this crop for winter feeding during the past few years. It has the merit of being able to recover well from insect attack in its early growth; it will grow comparatively well even on second-class land, and certainly produces a bulk of feed on a small area. For example, whereas the mean seasonal stocking capacity of the farm for several years on lupins was 595 sheep-days an acre, the corresponding figure for chou moellier, which included a poor crop in 1943, was 1,160 sheep-days an acre.

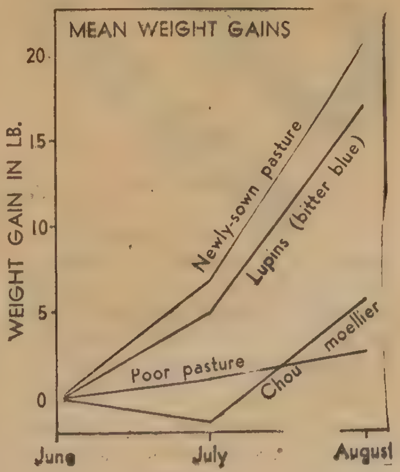


Fig. 1.

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* Since conducting these trials for the Department the author has joined the staff of Lincoln College, Christchurch.

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New Zealand Wool Sales

DATES FOR 1946-47

WOOL sales will be held in New Zealand in the 1946-47 season as follows:—

1946

NOVEMBER 25 (Monday), Wanganui 9 a.m.
November 30 (Saturday), Wellington, 9 a.m.
DECEMBER 5 (Thursday), Christchurch, 9 a.m.
December 9 (Monday), Timaru, 8 a.m.
December 13 (Friday), Dunedin, 9 a.m.
December 19 (Thursday), Napier, 9 a.m.

1947

JANUARY 6 (Monday), Wellington, 9 a.m.
January 10 (Friday), Auckland, 8 a.m.
January 14 (Tuesday), Wanganui, 9 a.m.
January 20 (Monday), Napier, 9 a.m.
January 27 (Monday), Christchurch, 9 a.m.
January 31 (Friday), Invercargill, 2 p.m.
FEBRUARY 5 (Wednesday), Dunedin, 9 a.m.
February 12 (Wednesday), Wellington, 9 a.m.
February 17 (Monday), Napier, 9 a.m.
February 21 (Friday), Wanganui, 2 p.m.
February 27 (Thursday), Christchurch, 9 a.m.

MARCH 3 (Monday), Timaru, 9 a.m.
March 7 (Friday), Invercargill, 2 p.m.
March 12 (Wednesday), Dunedin, 9 a.m.
March 17 (Monday), Wellington, 9 a.m.
March 21 (Friday), Auckland, 8 a.m.
March 25 (Tuesday), Wanganui, 9 a.m.
March 31 (Monday), Napier, 9 a.m.

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However, results have been consistently disappointing with chou moellier. In each year the ewes in this group, judged from both the viewpoint of their weight gains during the winter and the weights of their lambs, have been well below those grazing lupins or young pasture and, indeed, only slightly better than those of the ewes on poor pasture.

Young pasture.—Although there is a firmly-established tradition of growing special annual feed crops for the winter feeding of ewes in Canterbury, it was thought desirable to test the possibilities of young, improved ryegrass/clover pastures in competition with the specially-grown crops. Fig. 1 shows that in favourable years such pasture as a winter feed for ewes is as good as any of the special crops tested, whether the viewpoint be from the weights of the ewes during the winter months, the lamb weights at marking, or the number of lambs sent to the works before weaning.

It is true that greater care is necessary in preparing the seedbed and in selecting the right time for sowing. Only Certified seeds should be used to get the highest production, and the inclusion of up to 50 per cent. of H1 (short-rotation) ryegrass is highly desirable, for this will help to provide the early vigorous and palatable growth that is so important.

With any pasture, and especially with autumn-sown pasture, dependence upon favourable weather conditions from February to May becomes very great, as was demonstrated in 1945, when a late sowing followed by dry, cold conditions resulted in no young pasture being available for winter feeding, while crops of chou moellier and turnips were good.

The mean stocking rate of five autumn-sown pastures at Kirwee during their first winter, up to September 1 in each case, has been 232 sheep-days an acre. This means that rather more than twice as many ewes could be over-wintered on the same area of lupins and up to five times as many on chou moellier or turnips. In addition, the actual costs of seeds, manures, cultivation, and sowing are almost exactly double similar charges for any of the feed crops. On the other hand, a good pasture should provide grazing for a number of years, and when expenditures are looked at, as they must be, from the point of view of yearly costs and returns on a paddock basis, it is possible that a greater dependence upon newly-sown pasture will prove the more economical method of over-wintering ewes. It is obviously of importance that this aspect of winter feeding ewes be critically examined.

Green oats.—Following over-wintering from early June to mid-August on a high nutritional plane consisting of either lupins or young grass, one group was put on to greenfeed oats at the commencement of lambing and kept continuously on this feed for at least two months. Results indicated that although a paddock of young oats is not a suitable place to lamb down ewes, and even later the lambs did not make quite such good gains as similar ones kept on grass, there were no losses among either ewes or lambs which could be attributed to the oats feeding.

2. Medium plane:

The method of running in-lamb ewes on relatively good, old improved pastures and giving them access to clover or lucerne hay has been shown to give results which vary a great deal according to the season and the quality of hay given, but which are always below those obtained with the ewes on grown crops or young pasture. In addition, the relatively low carrying capacity has to be considered. If an ample supply of good hay is available, and especially if access to young pasture or other greenfeed is given the ewes just before and after lambing, this method is likely to prove satisfactory.

3. Low plane:

A group of ewes was included each year which grazed an old, run-out pasture from June to September at a rate of stocking of approximately 2⅓ sheep an acre and were given hay, limited to ½lb. a sheep a day. These ewes were in fact submitted to a harsher treatment than would occur on even a badly-run farm, and it was no surprise to find that, even in a favourable season, these sheep actually lost weight in spite of carrying a lamb, and could rarely care for more than a single lamb.

The reason for including this group was to determine if sickness and losses observed in ewes six to eight weeks after lambing in 1937-38 were related at all closely to their nutrition during the winter.

Mortality

Throughout the six years' work at Kirwee there has been no recurrence of the mortality referred to in the introduction. Deaths in ewes have been very low throughout the winter, except in 1945, when some groups received a more severe check than others following heavy snow late in July, and losses from pregnancy toxaemia ("sleepy sickness") were high in these groups. It is interesting to see that even in the low-plane group on poor pasture, where considerable loss in weight occurred, there was no greater incidence of pregnancy toxaemia (twin lamb disease, "dopiness"). This indicates that it is most necessary to avoid any sudden reduction in food intake in the six weeks before lambing, especially in ewes which have been well fed during the earlier part of pregnancy.

Effects of Drenching

A careful watch was kept on the degree of worm infestation both in the ewes and their lambs right through to weaning. This was done by making worm egg counts on faecal samples collected at monthly intervals. Half the ewes in each group were drenched with 25 grams phenothiazine twice before lambing. After lambing, the lambs from drenched ewes were drenched twice with phenothiazine (10 grams and 12½ grams) before the first draft of fat lambs was taken in December.

Each year the level of worm infestation in the ewes throughout the winter remained very low, so that the lack of response to drenching was no surprise. The lambs, too, exhibited egg counts which were similarly low, but in some years there was a sharp increase just before weaning. Up to this time, however, drenching was shown to have no effect upon weight gains in suckling lambs.

Lambs

Lambing began in mid-August and the lambs were marked and weighed about a month later. Most groups of ewes and lambs ran together on saved pastures from the beginning of lambing, with the exception of a group which grazed greenfeed oats (Algerian) through the spring and two other groups receiving the same winter feed under different systems—one rotationally grazed on good pasture, the other set grazed on the same area of similar pasture.

The way in which the winter feeding of the ewes affects the marking weights of their lambs, the weight gains made up to early December, when the first fat lambs went to the freezing works, and the percentages obtained up to weaning are shown in the following table, in which the results with the same treatment each year have been put together.

TABLE 1.—Average Marking Weights, Weight Gains, and Percentage to Works for four years.

Type of Feed	Weight at Marking lb.	Weight Gain to December lb.	Sent to Freezing Works* per cent.
Lupins	23.2	38.5	31
New pasture ..	23.5	41.0	33
Old pasture—hay	18.0	35.3	16
Chou moellier ..	21.8	33.3	20

* No lambs were fit for freezing works by weaning in 1942. This reduces average figures.

The lambs from ewes given either young pasture or lupins (with or without Italian ryegrass or oats) were heavier in weight at marking and made the best weight gains, and more lambs were sent away before weaning.

No deaths or sickness occurred in ewes or lambs kept on green oats from

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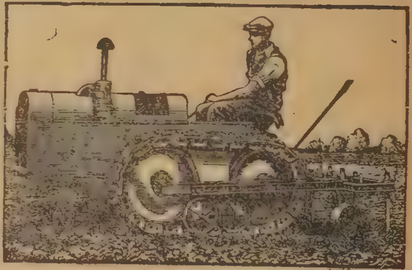

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the beginning of lambing until the end of October. The lambs did not make such good weight gains as those on pasture.

The result of a comparison of rotational and set grazing methods of grazing pasture in the spring have given conflicting results and further trials are necessary.

Summary

In feeding trials with Corriedale ewes at the Kirwee Experimental Farm over the past six years various crops and methods of management have yielded the following results:—

1. Newly-sown, improved strains of pasture grasses and bitter blue lupins sown alone or with Italian ryegrass or green oats have consistently shown superiority over other feeds. Turnips on the comparatively rare occasions when good crops are obtained may be as good.

2. Chou moellier, either fed alone or with hay, has not proved entirely satisfactory, although its value in times of heavy snow has been demonstrated.

3. The method of winter feeding affects the number of lambs which can be sent away fat before weaning.

4. The degree of worm infestation in ewes during the winter under Canterbury Plains conditions has been found to be very low, while the worm burden of lambs remains low until the beginning of December. Drenching ewes in the winter or their lambs in the spring had no effect on subsequent weights, and it is probably unnecessary to drench lambs until about a month before weaning.

5. The rate at which lambs fattened from marking until weaning varied from year to year and appeared to be primarily due to qualitative changes in the pasture rather than to the amounts available.

Summer Fattening of Lambs

THE common experience in Canterbury is to get some 30 per cent. to 50 per cent. of lambs away to the freezing works before weaning, which, owing to the drying off of pastures which has occurred in most years by the end of December, must be accomplished fairly early in the New Year. This makes it necessary for most farmers to grow some special feed to finish fattening the rest of their lambs. In any event, it is convenient to have some such feed on the majority of the plains farms because of the large numbers of store lambs which come on to the market from mid-January onward from Banks Peninsula and the foothills country which stretches from Marlborough southwards, and also because such a summer feed crop as rape conveniently fits into the sort of rotation practised by most farmers in this province.

Deaths among lambs after weaning are in the main of two types—one sudden with few observed symptoms and the other as the apparent result of an unthriftiness which appears in a variety of forms. The first disease is enterotoxaemia, or, more popularly, "pulpy kidney disease," and affects sheep of all ages. The cause and pathology of this disease are known, and, although the factors which predispose sheep to infection are not so well known, losses in fattening lambs are neither frequent nor very widespread. Other deaths may follow a comparatively acute sickness associated with scouring and rapid loss of condition, with the lamb dying within a few days; or a more gradually increasing unthriftiness may settle on many lambs, which will, in addition, show such symptoms as loss of appetite, thirst, persistent diarrhoea, with death eventually coming to a high proportion.

Design of Experiments

The lambs used varied somewhat from year to year, but were generally of either half-bred or Corriedale type. Sometimes lines of store lambs were bought in the open market and sometimes they were all bred at the Experimental Farm. They can be regarded as typical of the majority of store lambs which go on to fattening feed in Canterbury.

On two occasions when the farm's own lambs were used, they were put on to feed immediately after weaning; otherwise several days must have elapsed before rape feeding commenced. This fact is not unimportant, for it was found that when weaned directly to rape the lambs would either only just maintain their weight or even lose weight over the first fortnight, whereas lambs put on after being purchased at the saleyards and then spending a few days on pasture at Kirwee invariably showed good weight gains from the beginning of the experiment.

Throughout this work it has been a major aim to discover what part worm infestation played in lambs fattening upon rape. For this purpose whole groups or half the lambs in a group were drenched either with bluestone-nicotine sulphate solution (1oz. of a 2 per cent. mixture), or with phenothiazine (either 15 or 20 grams). Phenothiazine only was used from 1942 onwards.

The eggs of the worms which cause sickness in sheep pass out in the droppings, and, under summer temperatures, will hatch within about 24 hours. The small larvae pass through three stages within 6 to 9 days. It is the third-stage larvae which climb on to feed and are eaten by grazing sheep. It will be seen, then, that if lambs on rape or any other feed are given a fresh break of feed each week, they should not be able to reinfest themselves with worms. To see whether this is an important factor during summer fattening there has always been a group included which grazed the feed in small breaks, moving to a fresh area each week.

During the years of severe losses it was a common belief among farmers that feeding hay as a supplement had a beneficial effect. Others believed that allowing the lambs to have a run-out to pasture similarly helped to assist the rate of fattening. All these practices have been tested.

1. RAPE

The methods of preparation and times and amounts of seeding for rape have been those commonly employed in Canterbury. The first sowing was usually made early in October and three more were made (all with 2½lb. of seed per acre) at about fortnightly intervals. The first two sowings were made with Broad Leaf Essex and the last with Giant rape. The group of lambs given set grazing were therefore moved to fresh rape corresponding to the different areas of sowing.

During the early years of these trials (1940-42) various other ideas were tested. For example, the effects of giving water, of a complete mineral mixture, of vitamins A and D, and of such other supplements as barley and oats, as well as lucerne and clover hays, were all tried.

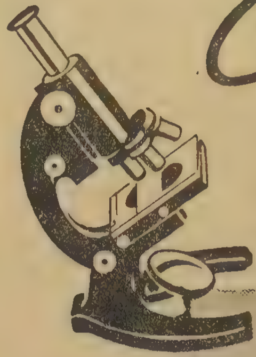
Results

Vitamins and minerals.—No effect at all was seen from the consumption of minerals or vitamins.

Grain.—Both barley and oats were fed during the first three years of these experiments and the growth rates of lambs which had the rape supplemented by these grains were never as good as those given rape only.

Hay.—Both lucerne and clover hays have been given, but again there has been no increase in growth rates. In fact the rate of fattening has not been as high as with lambs given rape only. It is probable that this is due to a substitution effect, through the lambs obtaining part of their daily dry matter intake from hay, a less nutritious food.

Run-off.—The effect of confining the lambs to a "run-off" pasture for various times has been tried. They have been kept on the run-off all day and given rape at night, kept on the rape all day and given a run-off at night, and kept on the rape all the



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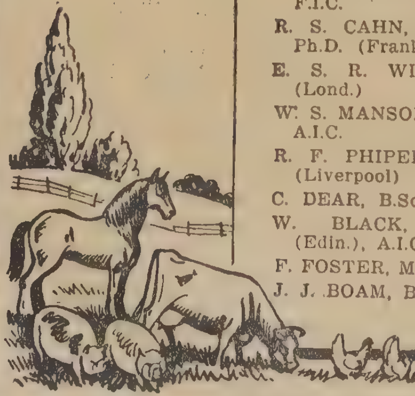

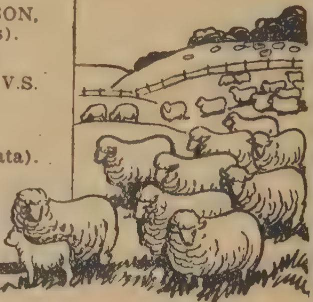

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time except for four hours on the run-off during the day. In 1946 a group was allowed to go on and off the run-off as it wished. At first the lambs largely stayed on the run-off, but in the latter weeks, as the pasture withered in the dry weather, they stayed on the feed. The growth rate was lowest when the lambs were kept on the run-off all day, but in all cases, except for a short time in 1945 while running out to exceptionally good pasture, the run-off lambs have made the poorest weight gains.

This is almost certainly due to the fact that in most years the summer pastures of Canterbury provide grazing which is of a low nutritional level. The fact that during the wet summer of 1945, when pastures remained green and growing, the run-out group made as good gains as the group set-grazed on rape is sufficient indication of this. And no doubt, if really good pasture could be supplied with any certainty in Canterbury during the summer, the number of store lambs fattened on rape could be greatly increased.

Break grazing.—To avoid the possibility of re-infestation with worms from either the rape itself or any self-sown weed or clover undercover, one group of lambs has been moved to fresh breaks of rape every 7 days. In every year the weight gains of these lambs has been closely similar to those made by set-grazed lambs.

Set grazing.—From the point of view of the speed of fattening no other method of management has proved any better than that of keeping the lambs on the rape, in fairly large numbers, continuously.

Rape-sparing effect. — Whenever lambs have been given supplements of grain or hay a rape-sparing effect has been demonstrated. This has also been obvious with the groups getting a run-off. Attempts have been made to measure this, and work is still proceeding which may result in a technique permitting reasonably accurate direct measurements of the extent of the saving of rape, or indeed of any feed which is being grazed. The preliminary work so far done would indicate that this may, with a consumption of 6oz. of hay per sheep per day, be as much as 40 per cent. of the lamb's daily intake of rape without a supplement. In other words, under certain conditions it may be possible to fatten 40 per cent. more lambs in the same time.

The effect of drenching.—Throughout each trial the degree of worm infestation of the lambs has been closely followed by means of making regular faecal egg counts on at least a third of the sheep in each group, half of which would be drenched and half undrenched.

The effect of drenching with phenothiazine has been obvious as far as the reduction of egg counts is concerned, but in most years there has been no effect on the weights of the sheep. Only when the average faecal egg count rose above 2,000 eggs per gram did drenching have a beneficial effect on the weight gains. This occurred in 1943 and again in 1945.

It has been found that even in the undrenched sheep the worm infestation of lambs drops very markedly from mid-March onward. This would indicate that if lambs are given one, or possibly two, large doses of phenothiazine when they go on to rape or shortly afterwards, there should be no need to drench them again. This point is being investigated at present.

The danger of reinfestation is probably likely to occur only in the occasional wet season which favours alike both worm development and the growth of clover undercover in rape. It is under these conditions that the system of weekly moves on to fresh rape is likely to prove valuable.

2. SWEET BLUE LUPINS

In 1942 small quantities of seed of the sweet blue lupin became available. As it had been shown by workers at Lincoln College that this was likely to prove a suitable summer fattening feed for lambs, it was thought desirable to test this crop on the lighter land representative of most of Canterbury in comparison with rape.

Consequently, in 1943, a section of the first rape paddock was sown to sweet blue lupins, but scarcity of seed meant that only two groups of lambs could graze the lupins, and that only for six weeks. During that period their weight gains were slightly better than those of the corresponding rape groups.

In 1944, 1945, and 1946 half of each rape paddock was sown with sweet blue lupins (1½ bushels per acre) and the same number of lambs put on to graze under the same series of treatments as the rape lambs.

It has been made clear that a comparison of different methods of grazing lupins gives practically the same results as the study with rape. In comparison with rape, lupins have shown themselves equally good, though no better, in the rate at which lambs will fatten when grazing upon them. Although the initial bulk of feed has in each year been greater on the lupins, the amount of second growth is much less than with rape, so that the total stocking capacity is likely to prove about the same.

Sweet blue lupins do not allow the same latitude as rape in the time they can be most profitably fed. There is a comparatively short period, which of course varies with the season, between the time they reach maximum growth, come into flower, and quickly pod up. Lambs will eat the flowers and green pods, but by the time the plants are at this stage the stems are becoming distinctly "woody"; and since this variety of lupin, unlike the bitter blue kind, is eaten from the top downward, it means that the plants are less completely and certainly less eagerly eaten by lambs.

Under the conditions at Kirwee it appeared that sweet blue lupins were best sown at least one week later than rape, if both were to be ready to feed together.

Some Canterbury farmers have reported damage done by hares to the young sweet blue lupin plants. At Kirwee very little of this has occurred, and actually the branching out of the plant which follows does not appear to be a bad thing at all.

Summary

1. Under the conditions experienced in Canterbury over the past seven seasons it has been shown that lambs will fatten as fast when set grazed on fattening feed—kept continuously on fairly large areas—as under any other system tested.

2. Although a system of grazing feed in weekly breaks will not normally result in a better rate of fattening, it may be a good method to adopt in a wet season to avoid reinfestation from worms from clover undercover.

3. There is a feed-sparing effect when hay or grain supplements are fed, while the rate of fattening is slowed.

4. Both these effects are accentuated during most summers in Canterbury when lambs are given a run-out to pasture. If it were possible—as it is occasionally—to provide really good pasture, the feed-sparing effect may be obtained without the lowered weight gains.

5. Drenching with phenothiazine had a beneficial effect only in years in which the faecal egg counts of the lambs were over 2,000 eggs per gram. This occurred in wet summers.

6. Giving minerals or vitamins as supplements to lambs on rape had no beneficial effect.

7. On the data provided by three trials it may be said that lambs will fatten as well on sweet blue lupins as on rape, and that although the initial bulk of feed is greater with sweet blue lupins, lack of regrowth probably results in total stock-carrying capacity of the two feeds being about the same.

A further article on winter feeding of hoggets will appear in a later issue of the "Journal."

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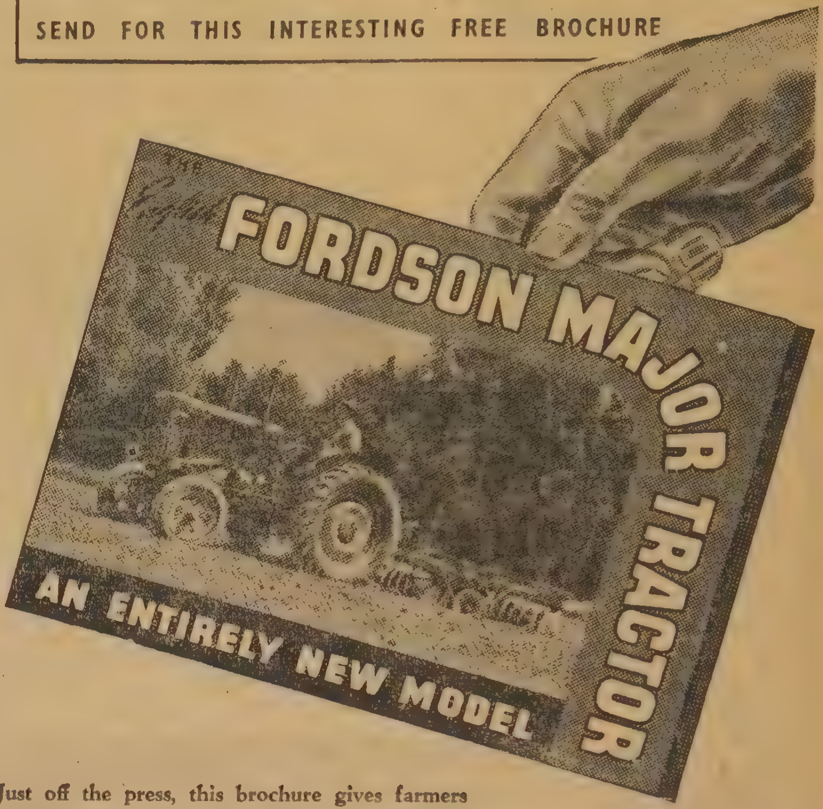

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CURD FOR FEEDING PIGS AND POULTRY

Preparation and Storage

By H. M. PEIRSON, *Superintendent of the Pig ndustry*, and G. M. MOIR, *Dairy Chemist, Dairy Laboratory, Wallaceville.*

The need to store food for both man and animal against winter shortage goes back to the days before history. In the 18th century surplus skim-milk is said to have been soured and stored in brick cisterns to provide winter food for pigs. Scientifically-conducted trials accompanied by chemical analyses have now made clear the principles on which practical methods of storage depend.

WHERE pigs are kept on dairy farms it is not always possible to have enough animals on hand ready to consume the ample supplies of skim-milk or buttermilk which are available in the flush months of the dairy season. This valuable feeding material is wasted unless arrangements are made to dispose of it otherwise, and it is also wasted if pigs are overfed. On the other hand, it is usually necessary to keep a number of pigs—sows and litters, slips and stores—during the winter, when practically no dairy by-products are available. Various ideas have been put forward with the object of saving surplus milk in the flush of the season in some form to have available for feeding during the winter period of shortage, when high-priced foodstuffs have to be purchased. One method which has been tried with varying success is to store curd prepared from skim-milk or buttermilk.

JUST as in making silage, the storage of curd depends on the development of acidity in the milk and the exclusion of air from the resulting curd. Because of the presence of undesirable putrefactive bacteria, especially in milk, there is more risk of milk curd decomposing than there is of silage. The general results obtained by those who have stored curd are satisfactory, despite occasional failures, which involve a fresh start after discarding the spoiled material.

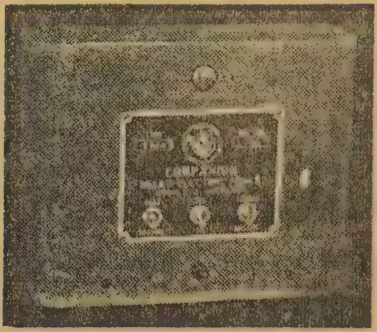
The essentials of the process are to sour the milk and agitate and break up the curd to allow gas to escape so that the curd can settle to the bottom of the storage tank. The surplus whey is drawn off and fed to the pigs. The curd can either be removed and stored in drums, or left in the original container with a covering of whey on top to keep the air out.

For several years pressing enquiries have been made by farmers for information about how curd could be prepared and stored. To meet these requests various trials have been undertaken, but these were not successful on account of various difficulties, including the provision of a regular supply of suitable buttermilk. But after some preliminary investigations during the 1944-45 dairy season a series of trials was undertaken during the 1945-46 season at Featherston, where buttermilk from the local dairy factory was being used at the piggery associated with the Japanese prisoner-of-war camp. The recommendations which follow are based upon the results obtained from these trials, together with observations made by Departmental officers over the last 16 years.

Supplies of Milk

On dairy farms where varying amounts of skim-milk are available storage of curd on a small scale may be carried out to begin with, and the results of such trials should provide any interested farmer with useful experience which will enable him to decide whether to provide the necessary facilities to store curd on a larger scale. Where a farmer has a contract to purchase the buttermilk from a dairy factory for pig feeding he will have a sufficient supply of material to enable the storage of curd to be

Curd storage trials at Featherston.



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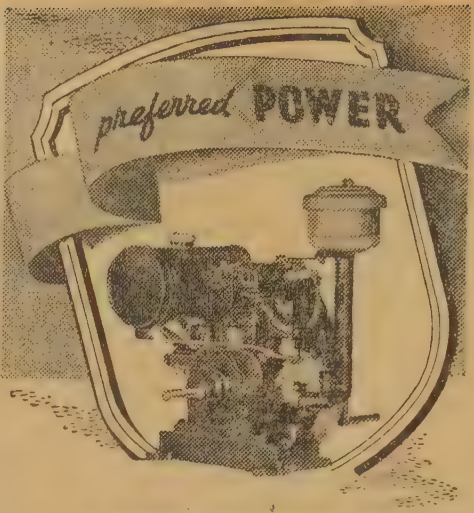

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undertaken on a large scale, but preliminary small-scale trials are recommended.

Containers

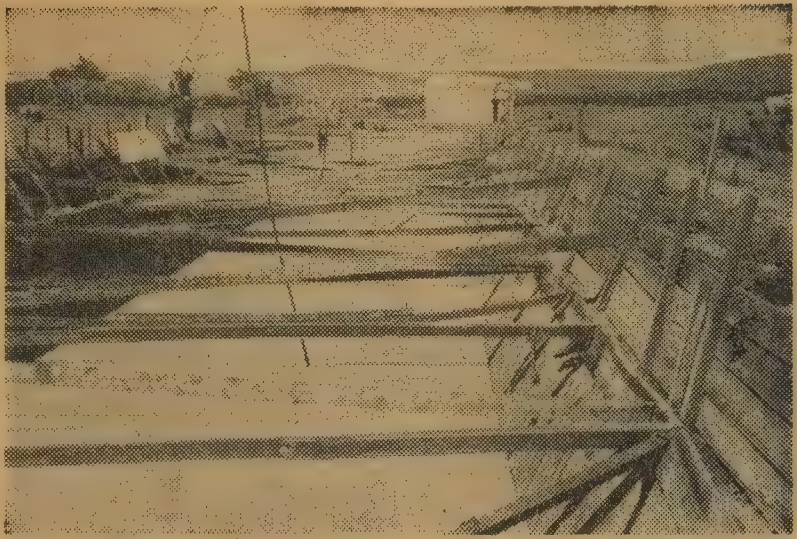
For small-scale trials one or two 50-gallon iron drums may be used, but wooden receptacles are preferable, such as 45-gallon or 80-gallon casks. These should be in good order, and if casks which have been used for tallow can be procured, they should be more satisfactory, as the tallow left in the wood will check leakage from the cask. In larger-scale storage one or more vats should be provided. Iron tanks may be used, but unless these are of heavy gauge, their life may be short owing to corrosion due to the high degree of acidity produced when the milk sours. In the Featherston trials the curd stored in iron drums was not eaten quite so readily by the pigs. Galvanised iron is not to be recommended, as the zinc used for galvanising will be dissolved and may cause slight poisoning when fed later to the pigs. In some cases farmers may be able to procure from a nearby dairy factory a discarded wooden tank or a copper vat which has been used for holding cream. It will not matter very much if the vat has some of the tinning worn off it.

Concrete storage tanks have been suggested, but these are expensive to erect and are likely to have only a short life of two or three seasons, because the acidity of the curd will eat away the cement. In England brick cisterns or tanks appear to have been used over a long period for this purpose. Probably the brickwork would be pointed up inside with fresh mortar every year.

Arthur Young, F.R.S., a pioneer of scientific farming, compiled a book entitled "The Farmer's Calendar," the eighth edition of which was published in 1809. In the calendar for May he writes, "As the dairy will this month afford great plenty of buttermilk and cheese whey, all that is not wanted for the present stock of sows and pigs should be reserved in brick cisterns." He repeats this recommendation in the calendar for August, and for January refers to the use of the stored material for feeding winter pigs.

If suitably-constructed wooden vats can be procured, they will be found ideal. The shape does not matter, and provided the joints are tight, circular or rectangular vats should prove equally satisfactory. When using a wooden vat it is particularly important to have it thoroughly cleaned to begin with. For this purpose the vats should be kept filled for a week or 10 days beforehand with water containing some slaked lime (1lb. per 100 gallons) or caustic soda (1 dessertspoon per 10 gallons). This preliminary soaking will also enable the wood to swell and eliminate any leaks.

CURD PRESERVATION CONTAINERS



Clay pit holding 30,000 to 40,000 gallons of preserved curd on the property of Mr. C. Sankey, Awanui, North Auckland.

After being thoroughly scrubbed the interior of the vat should be disinfected by rinsing with chloride of lime solution made by dissolving a pound or two of chloride of lime in 40 or 50 gallons of water. This should be vigorously applied with a brush or sprayed around the inside of the vat and left for at least a day before the vat is used. If a failure occurs in any container, especially a wooden one, it must be well soaked with limewater, scrubbed, and disinfected with chloride of lime. In some places where the ground consists of a suitable impervious clay a pit in the ground has been successfully used, but there are not many districts where the clay subsoil is suitable for digging such a pit.

Location

The use of a pit has the advantage that the temperature of the curd during storage is appreciably lower than that of a container which is above the ground. During the chemical investigations which have been undertaken it has been shown that certain changes associated with the storage of the curd take place more slowly at lower temperatures. Consequently it is an advantage to arrange for the containers, whether small or large, to be placed where they will be sheltered from the sun during the hot summer weather. If lids or a roof can be provided, they have the advantage of preventing the dilution of the curd with rain water, and also prevent the access of birds and vermin, but lids or covers are not considered to be essential. To comply with the Dairy Industry Act the containers or pit should not be within 50 yards of a milking shed; they should preferably be located at the piggeries.

Method

The curd is produced from milk or buttermilk by the action of milk-souring bacteria which change the milk sugar or lactose into lactic acid. In addition to milk-souring bacteria, large numbers of various other types of germs are always present in skim-milk or buttermilk, and if for one reason or another certain undesirable types should predominate over the milk-souring germs, these undesirable types may gain the upper hand and are likely then to cause the curdy material to decompose and putrefy so that it is wasted.

To ensure the predominance of the desirable milk-souring types it is an advantage to provide at the beginning of the storage a sufficient supply of "starter" such as is used in cheese factories, with the object of starting the bacterial development in the right direction. Even though satisfactory results can be obtained without it, arrangements should be made to get sufficient starter to provide about ½ to 1 per cent. of the volume of buttermilk first placed in the container. For example, to a 40-gallon cask rather less than half a gallon of starter should be added. For a large vat sufficient starter should be prepared a day or two beforehand, so that it is ready to be mixed in the vat with the first large batch of milk added to the vat.

In preparing curd to feed to poultry rennet is sometimes added to warm skim-milk. This enables curd to be quickly produced, for if the milk is kept warm for an hour or two and the curd broken up, the whey readily separates, so that the curd is ready for feeding the same day. Provided

CURD PRESERVATION METHODS

Storage tanks used by Mr. F. Heaven, Masterton.

little or no souring occurs, this curd is richer in minerals, especially lime and phosphates. But in storing curd for pig feeding rennet is not recommended, as it is a very potent ferment which is likely to accelerate somewhat the decomposition of the curd in the later stages of storage.

After the milk has been thoroughly mixed with the starter it should be left undisturbed for several days. Souring will take place slowly, the rate depending upon the temperature, being faster in warm weather. After two or perhaps three days the whole mass should be completely sour, but it should not be stirred at this stage. Certain of the germs present in the milk produce gas in addition to lactic acid, and during the course of about a week this gas, as it rises to the surface, gathers up with it the curd from the bulk of the milk, to form a more or less compact layer of curd on top. The curd should be allowed to accumulate in this way for at least a week, and there is no harm in leaving it longer, perhaps for a fortnight. During this time surplus whey drains out of the curd, and the top layer may become fairly dry through the action of sun and wind. The drainage of whey from the top layer of curd gets rid of most of the remaining milk sugar in the curd, so that later on the amount of sugar available to produce gas and bring the curd to the surface is appreciably reduced.

After 10 to 15 days the curd should be broken up, using a clean tool such as a garden fork, and if everything is going satisfactorily, most of the curd will settle to the bottom of the cask or vat. By the following day the whey should be on top with perhaps a few lumps of curd here and there, and this whey can be removed with a bucket or pumped off to be fed to the pigs. At this stage the whey is still a valuable feeding material, because in addition to minerals it still contains a fair amount of milk sugar, and a portion of the curd in such a finely-divided condition that it has not settled with the main bulk of curd.

If a pump is available, a more convenient procedure than breaking the curd as described above may be to insert a piece of hose through a hole in the top of the curd so that the whey underneath the curd can be pumped off for feeding to the pigs. A little care may be needed to see that the pumping is stopped when the curdy material begins to pass through the pump, and at that stage the curd left in the vat should be broken up with a fork as previously described, or removed to drain as explained later.

When the whey has been removed more milk should be added to fill the container again, and the mixture left a few days to sour again and allow the curd to rise to the surface. A shorter period will suffice on this occasion as compared with the first souring period, and it is easy to judge when the curd is firm enough to be broken up and the whey removed as before. More buttermilk is then added, and after the third or fourth addition the curd will usually remain in the bottom of the container, except for a few lumps which persist in rising to the surface, due to gas which forms within them. On being touched with the finger or broken up with the hand these lumps usually settle to the bottom.

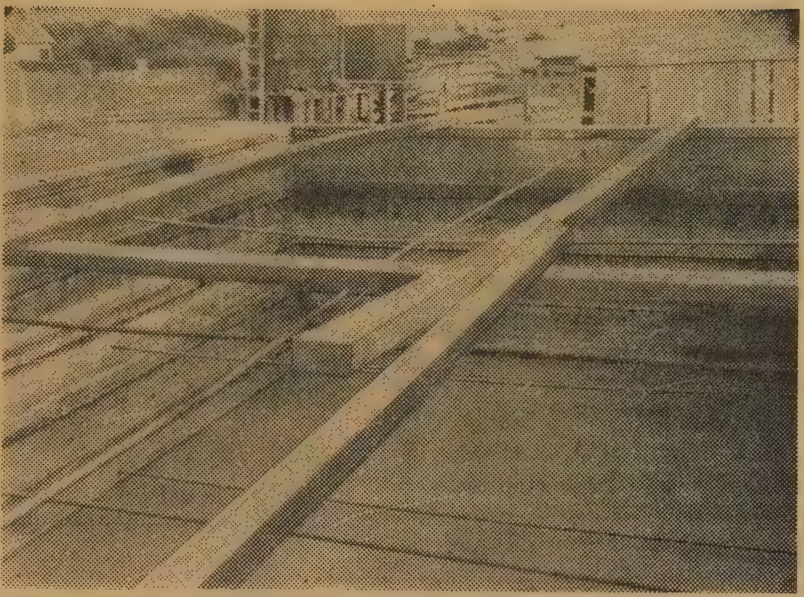
According to the supplies of milk available, the addition of further milk to the container and the removal of whey to the pigs may be repeated at intervals which will depend upon various circumstances. If a large container is in use, daily removal of whey and addition of milk can be practised, but with smaller containers these may become filled with curd after two or three weeks so that no more can be added. Generally better storage results are likely to be obtained if the addition of milk is not made too frequently, say once or twice a week rather than daily. When small containers have been filled for a month or two some evaporation or leakage may take place, and the curd remaining in the cask will keep better if more milk is added to replace what has disappeared.

There is no secret in the process here described, as it is fundamentally of great antiquity. Success depends primarily on beginning with clean containers. Unclean conditions encourage the development of putrefying bacteria which soon destroy the curd, so that its preservation is doomed to failure, especially if souring does not take place in about two days.

Alternative Methods

As the resulting curd contains nearly 90 per cent. of water, the containers must be of large capacity, either one very big or a number of small ones, in order to provide a substantial amount of feeding material. But much less storage space is needed if the curd is drained from the whey and pressed to reduce the water content to about 70 per cent., as the dry solids present are thus increased from about 10 per cent. to 30 per cent. For storing curd in this way discarded tallow casks are desirable, as the fat in the wood will make them both water-tight and air-tight. Preservation of curd in this way has often been successfully accomplished. Curd prepared from skim-milk by the ordinary souring method for lactic casein was some years ago packed in tallow casks and sent overseas to Europe, where it was used for human food.

In 1930 Mr. A. E. Browning, of Orini, Waikato, adopted this method, when in order to provide curd to feed to laying hens in winter he used discarded iron tar drums in which to preserve the curd from the surplus milk in the summer. The procedure was quite simple. The milk from the dairy herd was piped to two 400-gallon square iron tanks at the piggery, one being reserved for the night milking, the other for the morning supply. The pigs were fed in the morning from the previous night milking and at night from the morning milking, the milk being drawn from a large tap at the bottom of each tank. Before feeding the pigs, however, the curd which



Inside of Mr. J. Snell's curd container.

had formed and floated to the top of the milk was removed and placed to drain on a frame made of wire-netting covered with scrim, on which it was left to drain until the following morning.

Each tar drum was prepared by rinsing out with a weak solution of formalin, a teaspoon to a gallon of water, before placing the partly-dried curd into the drum. The curd was thus added to daily until the container was full, when it was covered with a tarred sack to keep the contents more or less air-tight. The drums were then placed in a shady place where they remained until required in the winter. Forty drums were prepared in this way and when opened up about 5 months later were found to be in good condition except for the first two or three inches at the top.

More satisfactory exclusion of air might be obtained by using a neat-fitting wooden lid to place inside the drum under the sack, on top of which a few large stones should be placed to keep the lid pressed down. Storage of curd in this way involves more trouble than feeding it fresh to poultry as described in the Department's Bulletin No. 239, by E. R. Marryatt, but the stored curd provides a very valuable foodstuff to have available in winter.

The preparation of curd in these ways is essentially a cheese-making process, though rather different in various respects from the factory methods used in New Zealand. The storage process might, however, be modified to yield a kind of skim-milk cheese, such as is made in Continental countries. To do this anyone who can obtain the necessary facilities should proceed as follows:—After the curd has gathered on the top of the vat and become firm after remaining there for some days, it should be removed and placed in cheese hoops lined with bandage in the usual way. The resulting skim-milk cheese would require to be pressed for two or perhaps three days. On removal from the hoops the cheese may need to be placed for a day, or perhaps two days, in a tub of brine (10 per cent. salt solution). Apart from the preservative effect of the salt, the object of this is to enable the formation of a good rind which will bind the cheese together and exclude the air from the interior. Over-salting must, however, be avoided, as pigs cannot tolerate too much salt. On removal from the brine the cheese should be stored in a cool place away from birds and vermin.

Attempts have been made to dry the curd obtained from buttermilk by placing it on racks above the boiler in a dairy factory where there is ample heat going to waste. But a great deal of attention is needed to get large lumps broken up and dried sufficiently so that putrefaction does not develop later when the material is stored in sacks or casks.

Feeding Value

In the series of trials carried out at Featherston the buttermilk curd was stored in both large and small containers for periods of six to eight months, without showing any obvious signs of deterioration, although the results of delicate chemical analyses showed that there was a slight tendency for the curd to dissolve into the whey towards the end of the storage period. There appears to be no doubt that if the initial souring and curd formation are satisfactory, curd can be stored much longer. The possibility that toxic substances might have devoloped during storage was examined by feeding curd to over forty rats which were found to be able to live on curd as their sole diet without suffering any ill effects.

The curd resulting from this method of storage is of a rather mushy consistency, in which odd lumps of firmer curd may be found. This mushy material has a water content of nearly 90 per cent., so that the actual dry solids available for feeding purposes amount to just over 10 per cent. Of this about 6 per cent. is protein in the form of curd, while the remainder of the solids is also valuable for feeding purposes, especially on account of the mineral constituents. On the other hand the milk sugar originally present (which forms nearly half the total solids in skim-milk) is competely fermented during the early stages of storage, so that it is nearly all lost except for what has been removed in the whey drawn off while the curd is being accumulated.

So it must be emphasised that the total solid content remaining in the mushy material is only a little more than half that present in the original milk, because of the considerable loss of milk sugar which takes place in conversion from milk to curd. But as a result of the reduced volume due to the

The 10,000-gallon container used by Mr. J. Snell.

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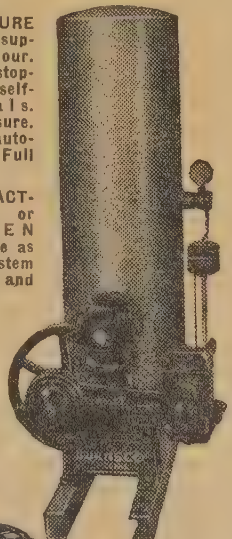

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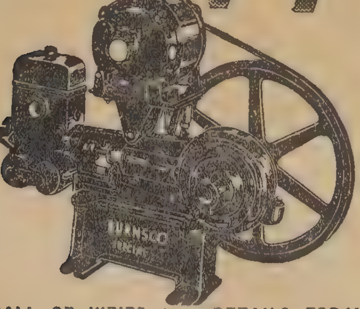

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removal of whey, the stored curd itself has about twice the feeding value of skim-milk, besides which its high protein content is particularly valuable in winter when such material is usually scarce.

As a comparatively large storage capacity is required to provide sufficient to be really useful, the idea may not appeal to many farmers, except those who happen to be favourably situated in obtaining suitable storage facilities. There is no doubt that if a further portion of the whey could be removed from the curd so that it could be stored in a drier form, either in casks or as a kind of cheese, the potential value of the storage idea might be appreciably improved.

Where dairy by-products, particularly buttermilk, are considerably in excess of requirements during the flush months and where it is the usual practice to purchase store pigs to utilise the surplus, it may be conceded that a method of curd preservation would be economically sound. It could obviate the necessity for purchasing store pigs on a rising market in the early summer, as is now the practice, and at the same time tend to provide a better market for store pigs in the autumn because of an assured winter feed supply in the form of preserved curd.

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For the small producer, however, it is probably more profitable to have pigs on hand appropriate to the milk supply and arrange the time at which sows farrow so as to have only sows with litters on hand when there is the least milk. May and June farrowings along with November and December farrowings will permit bacon to be made of the winter litters to market in November to January and pork of the summer ones to be disposed of in April and May.

Economic Value

In the Featherston trials approximately 3,000 gallons of buttermilk were used for conversion to 1,100 gallons of preserved curd. The original buttermilk contained fully 7 per cent. of solids and had therefore to begin with an equivalent of 2,100lb. dry matter as feed. The resultant preserved curd which contained about 11 per cent. of solids had a feed equivalent of 1,200lb. dry matter.

Thus in the conversion from milk to curd 900lb. or about two-fifths of the feeding value had been lost. Some, but not all, of this loss is recoverable if, when the whey is drawn from the curd, it is fed to pigs, but not being storable, it becomes an unavoidable loss as winter feed.

Feeding trials with the preserved curd were commenced on May 10, 1946, and concluded on June 18, 1946, a period of 38 days. Fourteen pigs were divided into two lots of 7 pigs, the gross weight of both pens being the same. One lot was fed all curd, the other curd and 1lb. of pig concentrate per pig a day.

As there was little difference in the final condition and the weight gain of either lot, the results of feeding are here considered as one trial. The total feed used for 14 pigs in 38 days was 1,100 gallons of curd, representing 1,200lb. of feed. The gross live weight of the pigs at the commencement of the trial was 1,302lb. and the final live weight 1,716lb.—a total live weight gain of 414lb., representing 276lb. as pig meat. At the winter schedule of 8d. lb. the pig meat produced was worth 184s., and deducting the cost of meals used at 2d. lb., this shows a return for the curd used of 140s.

The economics of the process in this case are that it required 1,100 gallons of curd representing 1,200lb. of feed, originally 3,000 gallons of buttermilk representing 2,100lb. of feed, and 266lb. of meal to produce 276lb. of pig meat, worth 184s. Against this must be charged the depreciation on the cost of the curd containers, and the labour involved in saving the curd, plus the cost of the meal used, and in addition account must be taken of the loss of 900lb. of feed through the conversion of the milk to curd.

Practical Experiences

The feasibility of curd preservation in New Zealand has been demonstrated over a number of years. In its practical use Mr. C. Sankey, of Awanui, North Auckland, has perhaps gone further and been successful in a bigger way than most other people, but he claims that certain details of his process are secret. He stores surplus buttermilk in a clay pit of between 30,000 and 40,000 gallons capacity. He is thus able to conserve sufficient curd to provide for the needs of all the pigs carried through the winter until ample supplies of fresh buttermilk again become available. Mr. Sankey has operated along these lines for the past 10 years without a failure and therefore claims to be the pioneer in New Zealand of his particular method.

Mr. W. Hollings, of Kaikohe, North Auckland, also made a success of curd preservation during the early years of the war and in one year he preserved 12,000 gallons in a wooden vat, besides using other smaller containers of from 600 to 1,000 gallons. The milk was stored during November and December and the curd used in the following May, June, and July. A detailed account of this was published in the "Auckland Weekly News" of December, 1940.

Mr. J. Snell, manager of the Helensville Piggeries, another pioneer of curd preservation, uses a wooden container of 10,000 gallons capacity and two smaller ones of 1,000 gallons. These are filled each summer, and although Mr. Snell admits failures, he is generally successful in saving sufficient for his winter needs.

Mr. F. Heaven, of Masterton, also conserves the surplus buttermilk in this way, using vats which have been discarded by dairy factories. All buttermilk is delivered to a central container holding 1,000 gallons, the overflow from which during the flush of the season runs into two other containers, one of wood which holds 900 gallons, the other a copper-lined vat with a capacity of 700 gallons. Mr. Heaven has followed this practice for the past four years without a failure.

These examples should provide sufficient evidence as to the practicability of curd preservation. The Department, however, is not in a position to make a recommendation as to the economic value of any method of curd preservation, but provided the foregoing instructions are followed a farmer can be assured of reasonable success.

Acknowledgments

The trials carried out at Featherston were sponsored by the National Pig Industry Council, which provided a small grant from its funds towards the expenses. The assistance of Mr. N. Scott, who managed the pig farm leased by the Public Works Department at Featherston where the storage trials were carried out, is acknowledged. When Mr. B. Donald resumed control of the farm he kindly allowed facilities for the completion of the trials, including the feeding of the curd to pigs which was carefully done by Mr. S. Benge. Mr. J. Thompson, manager, Featherston Dairy Factory, also assisted with various details.

A paper on the chemical work which formed an important part of these curd storage investigations is being prepared for publication.

Thinning of Fruit Crops

By S. FREW, Orchard Instructor, Blenheim.

ONE of the most important orchard operations during the next two months is the thinning of the fruit crop. In a normal season practically all classes of fruit trees will benefit from thinning, and attention to this work will result not only in increased crops but in improved vigour and condition of the trees.

EVERY season blossoming is sufficiently heavy for an excessive fruit set, but weather, frost injury, shy-bearing varieties, and the normal drop which usually occurs in late spring or early summer often tend to reduce the amount of thinning necessary.

How and When to Thin

Thinning should be started as soon as the natural drop has taken place and after all danger of a late frost has passed. To judge correctly how much should be thinned off and how much should be left requires experience. For general purposes pip fruits should not be allowed more than two to a bunch, and stone fruit should be spread singly not less than 6in. apart. Stone fruit can be thinned quite satisfactorily by hand. Clusters of pip fruit are often difficult to thin by hand without loosening the remaining fruits, so a pair of thinning shears should be used.

It is more satisfactory to do the thinning in two stages, the first or major thinning being followed about a month later by a more detailed operation when the season has progressed and the orchardist is able to judge whether a further reduction in crop is necessary.

Aims of Thinning

Primarily, thinning is the means of regulating the size of individual fruits and their distribution on the tree, but its importance goes further than that. It is one method by which the fruit grower can improve the quality of the crop, maintain the trees in good condition and growth, and reduce the tendency to biennial bearing—a habit which some varieties of pip fruits in particular are prone to develop.

As the prime reason for thinning is to increase the size of the fruits, the overladen tree requires first attention. An excessive crop means undersized fruit, and at all costs sufficient must be thinned off to ensure the remainder reaching marketable size. A crop of small fruit, even if up to minimum size, is not always an economic proposition. It is costly to handle, has a low market value, and the number of fruit required to fill a box is greater. It is therefore a sound proposition to endeavour to increase the size of this fruit by further thinning. That does not necessarily mean a reduction in the crop. The difference a slight increase in the diameter of individual fruits will make to the volume of the crop is not always realised. For example, to fill a bushel case requires 288 apples of 2in. diameter, 234 of 2¼in. diameter, 175 of 2½in. diameter, but only 125 of 2¾in. diameter. If the average diameter of fruits can be increased by ¾in., half the number can be thinned with little difference in the quantity harvested.

Thinning is supplementary to the work of spraying in disease control, diseased or blemished fruit being removed. This type of thinning can be attended to better during the second thinning.

Tree Conditioning

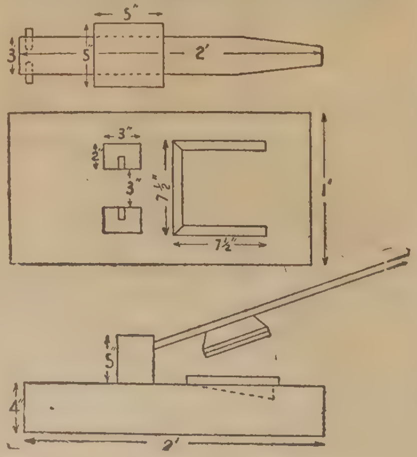
Good tree growth is easier to maintain with moderate annual cropping. Blossoming and fruiting are exhaustive processes, and an overcropped tree will become retarded in its growth. Unrestricted cropping in some varieties will result in the development of biennial bearing. The maintenance of a reasonable annual tree growth is the best protection from this habit, which has often been considered an inherent trait, fixed and immutable in some varieties. A happy medium of growth condition, commonly described as vigorous, is usually associated with maximum fruitfulness. Every fruit grower should endeavour to maintain this vigorous condition and its high productive standard.

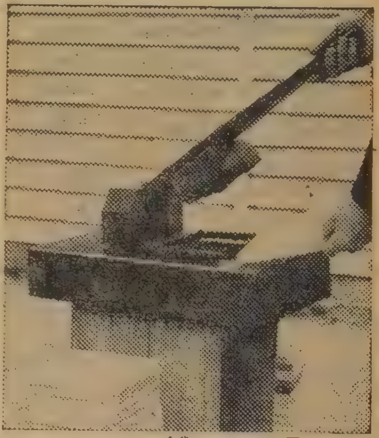
Thinning should be treated not merely as a means of growing better-sized fruit, but also as a long-range plan of tree maintenance which is well worth the practice.

Orchardists' Labour Saver — Case End Brander

THE work of branding the registered mark on case ends has been speeded up considerably by a Horotane orchardist who has constructed a stamping device. It consists of an inking pad, sunk into a bed on which the case ends are inserted, and a movable arm which carries the brand made of rubber.

On the first downward movement of the lever the brand is brought into contact with the pad and inked. As it is raised again, a case end is slipped into the bed and on the next downward movement the impression is made. In practice the stamp is inked by the use of one hand while the case end is being handled with the other.





[Green and Hahn photo.

From 750 to 800 ends can be stamped in an hour.

The equipment illustrated is used only for ends of the No. 6 case (7in. x 7in. x 18in.). Should it be desired to use it on other sizes the guide pieces would have to be altered.

For clean stamping two important points of construction should be noted. The rubber brand should be mounted on a resilient bed such as a layer of crepe rubber, and the stamp pad in the base should be set at an angle to the horizontal so that the brand will press on it evenly.

A. R. GRAINGER,
Orchard Instructor, Christchurch.

Making Best of Pastures for Fodder Reserves

By P. S. SYME, *Instructor in Agriculture, Warkworth.*

THE severe drought experienced in some districts during the past year resulted in fodder reserves becoming completely exhausted on many farms. The building up of fresh reserves and the better utilisation of farm pastures are discussed in this article, which points out that, though many farmers can produce feed very efficiently, they often do not use this feed to the best advantage.

AS more and more farms are completely sown in permanent pasture, there is a noticeable tendency in the dairying districts to rely entirely on grass for supplementary feed. Without disparaging the value of annual crops, experienced farmers point out that growing them in many districts is a gamble with the seasons. If the grass fails, the crop fails too. Moreover, it is pointed out, in the warmer districts there is no annual crop which can withstand drought as well as does paspalum, and for that reason grass may well prove safer than cropping.

Grass offers the added advantage that a surplus, stored as hay or silage, will keep indefinitely, so that the bumper crops of good seasons can offset the paucity of the lean years. Perhaps even more important is the belief that no crop on the dairy farm is quite as profitable as good grass. A small area of supplementary crops for pig feed can be thoroughly justified, but many farmers consider supplementary cropping on a large scale poor policy once a farm has been fully grassed.

Danger of Overstocking

Though reliance on grass may, with reservations, be both safe and profitable, the experience of the past year has exposed some pitfalls. After a series of good seasons in which they scraped through some farms tend to become overstocked.

If the farmer has a good reserve of hay or some alternative feed, he may be justified in taking some risks; but if he consistently overstocks with no adequate reserve of feed, he is inviting disaster.

Abnormal weather in the past season resulted in fodder reserves, even on some of the most carefully managed farms, being seriously depleted if not completely exhausted, and many farmers, taught by hard experience, have resolved never again to be caught napping. The problem now is how best to build up a fresh reserve of fodder against the next bad season.

Improved Utilisation Important

One obvious way to save more hay is to carry less stock. Though that policy may merit close consideration on some farms, it cannot be generally recommended if its adoption entails an appreciable drop in farm production, and most farmers will seek some alternative solution. Just what this alternative will be obviously depends on circumstances. For some the answer may be to buy extra hay or to grow an area of such crops as pampas grass or lucerne. For the great majority, however, the most hopeful solution appears to lie in improved farming methods, whereby pasture growth can not only be increased but can be more efficiently utilised. Improved strains of pasture seeds, more efficient topdressing, surface sowing, harrowing—all can play a part in increasing pasture growth and are being fully exploited on many farms.

Equally important, though perhaps less appreciated, is the effect of the system of grazing management. At the present stage of development it is possible that improved methods of pasture ultilisation may offer the best scope for

Building up a fresh reserve of fodder in Wairarapa.

MAKING BEST OF PASTURES FOR FODDER . . .

improvement in production. The key to better pasture management on many farms, as every farmer knows, is closer subdivision and the adoption of some form of controlled rotational grazing.

Basis of Good Grazing

Years of careful experiment have shown that a good pasture produces its highest yield if grazed at intervals of 3 or 4 weeks. Furthermore, it is desirable that the stocking density should be high enough to permit of the sward being quickly and evenly grazed and then closed up for a period of regrowth. This evidence has been amply confirmed by the practical experience of many of the most capable farmers in the dairying districts.

Successful rotational grazing, however, primarily depends on a sufficient number of small paddocks. If the paddocks are too large and too few, as on many farms, the grazing period is too prolonged, the grazing tends to be uneven, and control is much more difficult. Though the best size of paddock must depend on the class of sward as well as on the size of the herd, a grazing density of 10 to 15 cows an acre is common, though some very intensively developed farms may have a grazing density as high as 30 cows an acre.

The benefits of intensive subdivision are obvious and far outweigh any extra cost and inconvenience. Its adoption permits selected paddocks to be topdressed and closed up early in the autumn to provide out-of-season feed for winter and early spring. Rotational grazing and spelling also result in a greater production of grass, as well as promoting any desirable change in the grass-clover ratio, which can be induced as required by hard or lax winter grazing.

Apart from these very desirable advantages, subdivision enables more hay to be made, and at the same time reduces the consumption of hay.

Less Need for Topping

As the growth comes away in spring, selected small fields can be closed for silage or for an early crop of hay, so that surplus growth which might otherwise be wasted is used efficiently. Every farmer is familiar with one result of fields being too large: Grazing is patchy and so badly controlled that, while some areas are eaten down close to the ground, others become rank and run to seed, necessitating topping with the mower.

Though no one will deny that topping pastures may sometimes be desirable, it is less certain that the practice is unavoidable. Undoubtedly, with appropriate-sized fields and good management the need for topping could be greatly reduced on many farms, to the considerable advantage of the area saved for hay, as well as to the betterment of the grazing pastures of the farm.

As well as enabling every acre of pasture to be grazed to the best advantage at its optimum stage of growth, and allowing more hay and silage to be made, subdivision and appropriate autumn management can foster out-of-season growth on selected paddocks. That depends on the farmer having an adequate reserve of hay, and its timely use to ease the excessive drain on the available pastures during the critical late autumn period. For winter growth the grass must have a flying start and should not have been eaten down too close for some time before the cold weather sets in. Hence the need to begin feeding out early.

Overgrazing Undesirable

In general, efficient grazing means quick, even, and uniform grazing. As well as necessitating adequate subdivision, at certain times it may also entail the use of the harrow to spread cow droppings. Unless for some specific purpose such as weed control, or to alter the proportion of grass to clover, the sward should not be grazed too closely, particularly when growth is slow in the autumn and winter or where too close grazing is likely to expose the soil and result in its drying out during the hot summer months. This danger is less when the sward carries a good proportion of paspalum.

Though the past drought has emphasised the importance of an adequate reserve of hay in the economy of the farm, there are still wide discrepancies in the amount considered necessary.

Admitting that weather must be taken into account, it is unfortunately true that many farmers consistently save far too little hay. Some consider that 5cwt. a cow will see them through, but frequently others in the same district—and these are the best farmers—do not consider 15cwt. or 1 ton a cow too much. Certainly, in a season like the past one, the farmer with a good reserve in hand is likely to sleep soundest at night.

Whichever method or combination of methods may be adopted to solve the winter fodder problem, one safe motto for the all-grass farmer is: "Save more hay." Though it may present some obvious difficulties at this time, intelligently-planned subdivision will do much to make it possible.

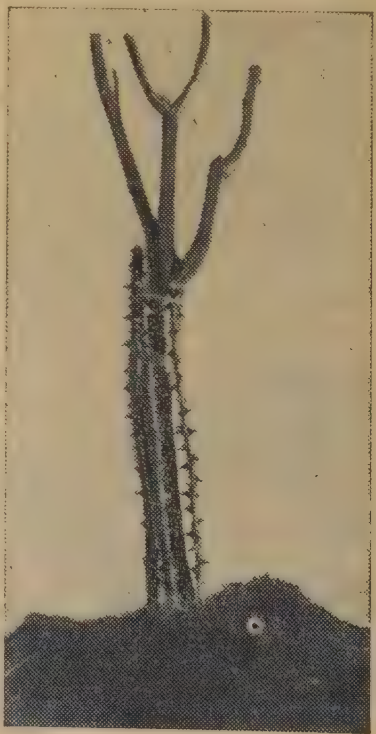
Protecting Young Fruit Trees from Rabbits

By L. R. RENOUF,
Orchard Instructor, Alexandra.

IN Central Otago, where they thrive in large numbers, rabbits cause considerable damage to young fruit trees by chewing the bark and at times ring-barking the trees, particularly during the first few years after planting. To protect the trees from this damage various materials have been used. One simple but very effective method is to protect the stem of the trees with brier wood.

THE brier wood is cut into lengths to reach from the ground to the fork of the tree. Three or four sticks, depending on the size of the stem, are placed evenly around and close against the tree, pushed an inch or two into the ground, and tied around the top.

This work can be carried out when planting the young trees. Three or four sticks will give adequate protection to the average tree. The many hard and sharp thorns on the brier effectively repulse the attempts of the rabbits to chew the bark. It is advisable to have the brier wood dry to assure that it does not take root. The brier may be left on the trees for several years if the tyings at the top are adjusted as the trees grow.



Selection of Site for Growing Raspberries

PRESENT production of raspberries in New Zealand is lower than for a number of years because of a steady decline in both acreage and average yield of plantations during the past decade. Considerable interest is now being shown in the industry by prospective growers, and this article by J. P. Hudson, of the Horticulture Division, offers guidance to those who are thinking of planting raspberries. Other aspects will be considered in future issues of the "Journal."

A number of factors have contributed to the falling-off in both area and yields of commercial raspberry plantations during the past few years. A similar serious decline has occurred in Great Britain and Canada (though not, apparently, in Tasmania), and a year or two ago it was even feared that the raspberry would go out of commercial production altogether in England.

Overseas the greatest single reason for the decline has been disease, and especially a complex of virus diseases, the widespread attacks of which robbed the canes of vigour and fruiting capacity. This problem has been attacked with promising results by energetic teams of research workers, and there is now a good prospect of more satisfactory raspberry crops being grown in Britain.

Reasons for Decline

In New Zealand several factors have contributed to the decrease in acreage and yield. Of these the following are important:—

1. The increasing difficulty of finding suitable casual labour for harvesting the crop. This will probably always be one of the raspberry grower's main worries, and is one for which a prospective grower should have in mind a clear solution before planting is begun.
2. The poor prices returned for raspberries during the 1920's and early 1930's when many stocks deteriorated.
3. The incidence of diseases and pests. It seems clear that if a grower starts with healthy, vigorous planting stock, he can now confidently expect to be able to control the common diseases and pests by proper management. The production of healthy planting stock is a different problem, which will be dealt with in a subsequent article.
4. The planting of raspberries on unsuitable sites where economic production is too dependent on favourable weather.

Choice of Soil and Site

Like most crop plants, the raspberry has a marked preference for certain types of soil, site, and situation. Any attempt to grow the crop under unsuitable conditions is bound to reduce the grower's chance of financial success.

Two fundamental facts should always be borne in mind: 1. Where the raspberry grows wild, in many parts of Europe and Western Asia, it flourishes in cool, moist climates (for example Scotland), and the cultivated varieties inherit this preference; and 2. the fibrous feeding roots of the raspberry may extend many feet around the plant, but are nearly all within the top few inches of the soil.

The raspberry will also, however, send roots deep into a well-drained soil, and so obtain a constant moisture supply in summer when the surface soil may start to dry out.

In a deep, well-drained soil the raspberry produces far deeper roots than most growers imagine, as the accompanying photographs clearly show. Even in such soils there are still many fibrous feeding roots near the surface which serve to collect moisture and plant foods from the fertile top soil.

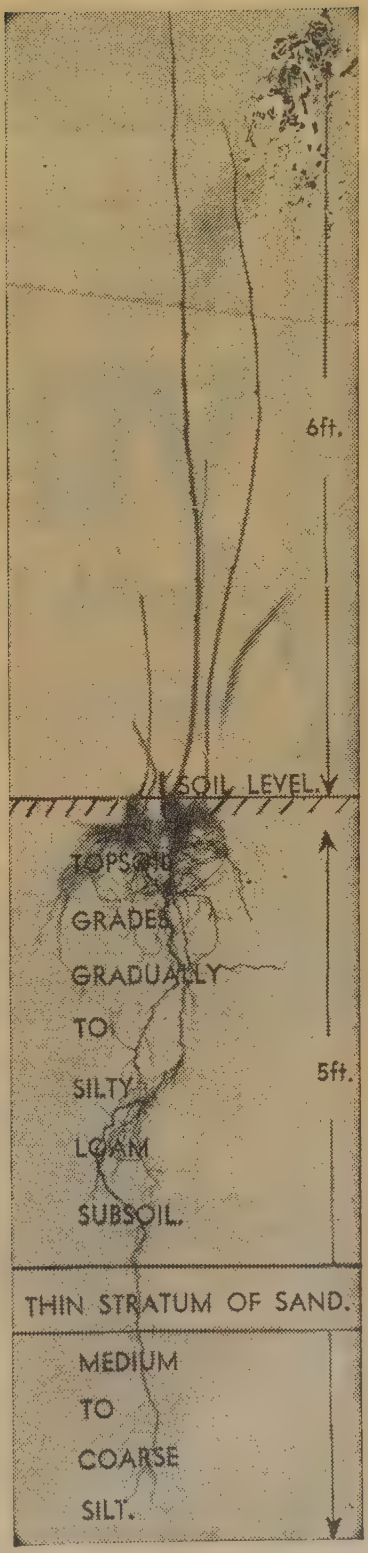
In addition, however, each crown sends a root system deep down into the sub-soil. In a well-drained soil, thoroughly wetted by an adequate winter rainfall, these deep roots can draw on the tremendous reserve of moisture available in the lower layers.

In considering an area for raspberry growing, careful thought should be given to its suitability from each of the points of view of soil, drainage, rainfall and water supply, frosts, and wind.

Character of Soil

The ideal soil is a deep, medium loam, grading gradually, without any hard layer, into a free-draining subsoil. In districts subject to summer drought a heavier soil is to be preferred, as

IDEAL DEEP SOIL



In a deep, well-drained soil raspberry roots penetrate deeply. The roots shown above went down more than 5ft.

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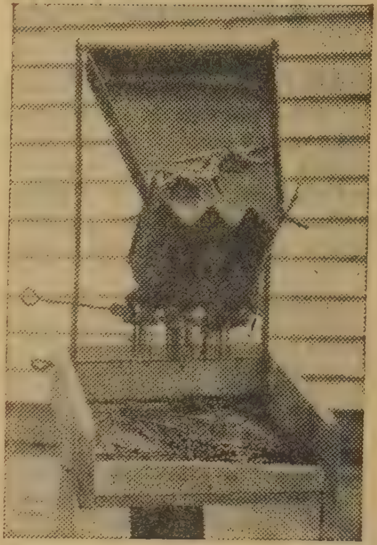


[Green and Hahn photo.

NAIL STRIPPER

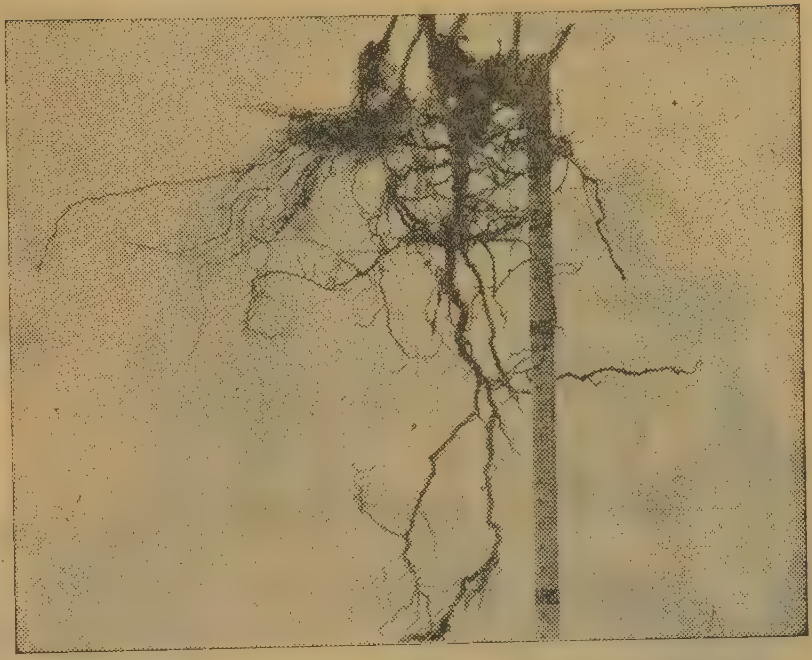
A labour-saving device for orchardists, known for many years but still absent from many case-making benches, is the nail stripper. This lines up a number of nails, heads all the one way, so that the case-maker can quickly seize a few between finger and thumb instead of having to dip into a tray and arrange the nails the right way by hand. Neat, well-made nail strippers may be bought from orchard supply organisations, but the illustration may be a sufficient guide to the orchardist should he desire to construct one himself.

A handful of nails is placed in the feed hopper and, assisted by the vibration of hammering during case-making, they slide down into the lower shelf, which is fitted with a number of slots which allow the body of the nail to drop through but hold the head up. The nails are then in the right position to be taken by the case-maker. A small proportion of the nails drops through to the lower tray, but these can be returned to the hopper.

A. R. GRAINGER,
Orchard Instructor, Christchurch.

DOMINION'S SHEEP FLOCKS

THE annual "Return of Sheep-owners," containing the number of sheep and lambs in each county, the names of owners of flocks on April 30, 1945, and comparative figures for 1944, has just been published and copies are available from the Publisher Department of Agriculture, Box 3004 Wellington, at £5 5s. each.



The rooting system of a raspberry growing in a deep, well-drained soil.

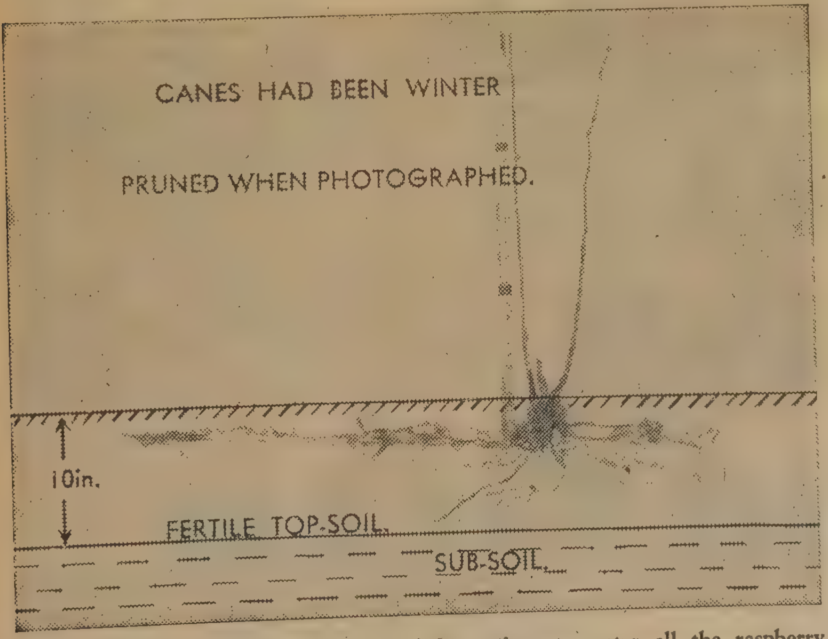
it holds moisture better in a dry spell. Light or sandy soils can be used for raspberry growing, but only if heavy applications of humus are made to hold moisture or if artificial irrigation is available to prevent the soil from drying out in periods of drought.

Heavy clay soils, on the other hand, are difficult to maintain in suitable physical condition without deep cultivation, which would injure the fibrous root system of raspberries. Moreover, the root system is apt to be sparse in clay soils, resulting in weakly canes.

Soil Drainage

The area must be well drained and never subject to flooding or to even temporary waterlogging after wet weather. If the water table rises all roots submerged for more than a few hours will subsequently die. Canes may reroot, but the loss of roots will not only affect the crop borne by existing canes but will also reduce the strength of the canes which will grow and bear the following crop.

Very many failures of raspberry plantations can be traced either to flooding of the area or to temporary waterlogging during abnormally wet weather. The greatest care should be taken to avoid planting raspberries where such conditions may occur. Local tradition and hearsay may give some indication as to whether a particular paddock is ever flooded, but expert opinion should be sought about the drainage character of the soil. The water table may not reach the surface in a wet spell, and its rise may thus not have been noticed by former occupants of the land. But waterlogging leaves indelible traces in the soil which can be recognised by an expert, who will examine the soil to a depth of at least 2ft. 6in. either by digging or with a soil auger. Orange-coloured mottling and the presence of small dark-chocolate or purple lumps in the subsoil are among the indications that the drainage is impeded.



With a shallow topsoil and a subsoil impervious to water all the raspberry roots are produced in the top few inches of soil.

Though waterlogging of the soil is so detrimental to the growth of raspberries, it may be possible to remedy this fault in an otherwise suitable area by a careful system of permanent drains; but these must be laid correctly and maintained efficiently. It is, of course, far easier to drain an area before planting the raspberries than after they have been established. If a drainage scheme is contemplated, expert advice should again be taken to make sure that the scheme is practicable and will achieve the required results. **The whole success of the venture may well depend on the efficiency of the drains.**

Importance of Rainfall

Other things being equal, the weight of a raspberry crop varies in proportion to the soil moisture, and the crop can be grown most economically where the soil moisture supply can be maintained most easily and cheaply.

Ideally, there should be an adequate annual rainfall, sufficiently well distributed throughout the year to ensure that the soil immediately below the surface never dries out. It is an advantage, however, if the latter half of the summer, when picking is in progress, tends to be dry.

In areas with an insufficient annual rainfall, but where conditions are otherwise suitable, artificial irrigation would be worth considering as a means of making raspberry growing

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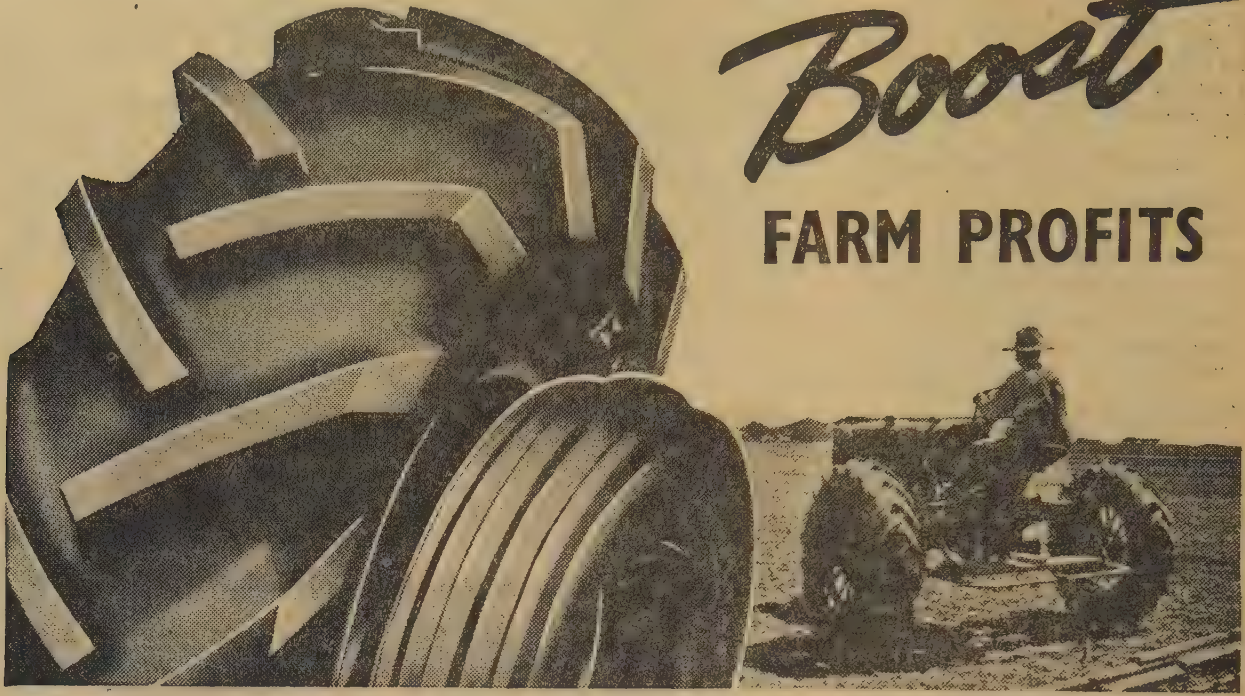

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. . . SELECTION OF SITES FOR RASPBERRIES

possible. The added expense of irrigation might be balanced by the regular and increased crops produced as a result of being able to give the canes water as and when they need it.

It is essential to prevent the feeding roots near the surface from drying out, as their death affects both the present and the following year's crops. This is especially important in soils where the raspberry does not produce deep roots.

Raspberries with the deep type of root system will not be nearly so dependent on a regular summer rainfall (or irrigation) as those whose roots all lie near the surface, but such deep root systems can be produced only in soil which never becomes waterlogged at the lower levels even in prolonged wet weather.

When a prospective grower is considering an area he should make careful inquiries about the climate of the district, and especially about the amount and monthly distribution of rainfall recorded over a long period. Hearsay evidence will not be as satisfactory as the official records, which should be available at the local library in the annual "Meteorological Observations" published by the Department of Scientific and Industrial Research up to and including 1938. Total rainfall for the year is recorded in the New Zealand Year Book, but this figure is much less important than the distribution of the rainfall during the year. Further detailed information about a particular area can be supplied by the Meteorological Office, P.O. Box 722, Wellington, or by the local representative of the Department of Agriculture.

Frosts Reduce Crops

The site should not suffer from late spring frosts, which may considerably reduce the crop. "Frost pockets" should be avoided; generally sites elevated above the valley bottom, and with a definite slope to encourage cold air to drain away, will be least liable to frosts.

Late-flowering varieties of raspberries are less damaged by frost than early-flowering types. Even when a proportion of blossoms is lost by frost, damaged canes usually produce some fruit from secondary growths, but this crop is later and not as heavy as the normal one.

The district meteorological records should also be consulted about frost, but this information is of less value than the rainfall records, as frost is a more localised phenomenon than rain, and is markedly affected by detailed topography. Some idea of the severity of frosts can often be obtained from a study of the types of plants which thrive in neighbouring gardens.

Freedom from High Winds

Especially during the summer months when picking is in progress, freedom from high winds is very desirable, as is absence of salt winds, which cause severe damage to the foliage. Adequate shelter will be especially needed in districts subject to hot, drying winds in spring and summer, as these seriously debilitate raspberry canes.

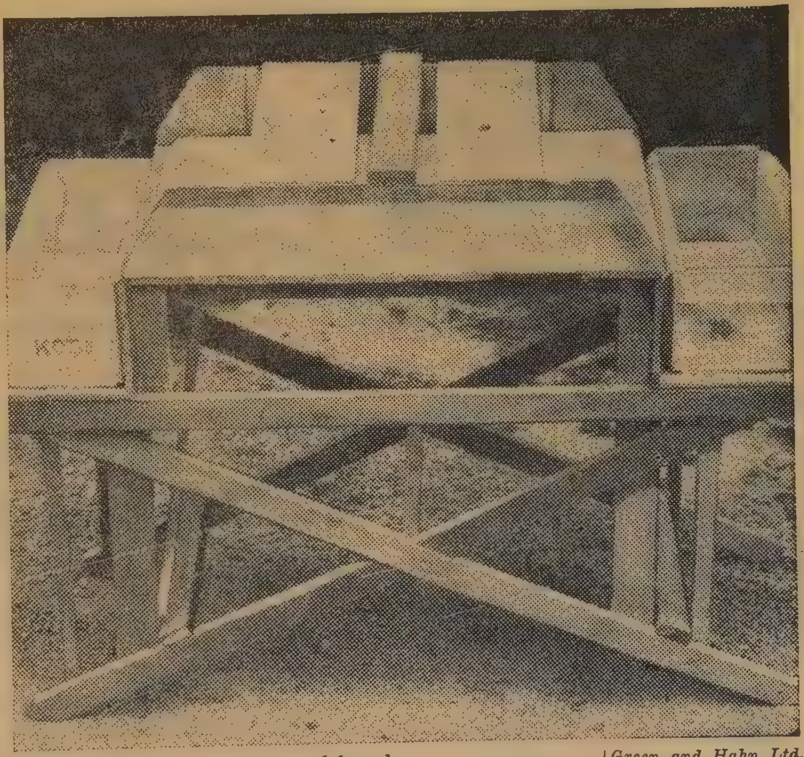
Security of tenure is, of course, necessary, as raspberry plantations should have a life of at least 7 to 10 years, and much longer if site, soil, and other factors suit the crop.

Photographs by Photo News, Ltd.

BUDDING OF FRUIT TREES

Budding is universally adopted as the best and most economical method of raising young trees. The operation of budding is fully described in Bulletin No. 81, "The Budding of Pip and Stone Fruit Trees." This bulletin is available free from your nearest office of the Department of Agriculture.

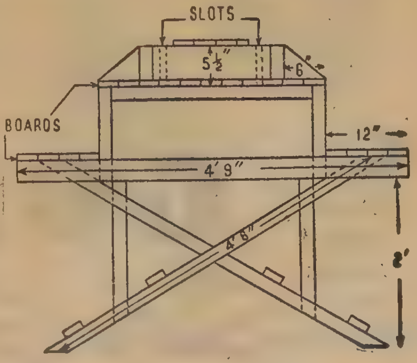
Orchardists' Labour Saver — Case-lining Bench



[Green and Hahn Ltd.

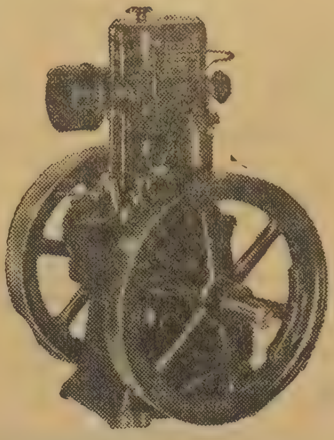
Illustrated above is a type of bench in use by a Horotane grower for holding case-lining paper and fitting it into the cases, which is done before the case goes to the packer. An operator can work at each end of the stand.

This stand carries little weight when in use and is therefore lightly constructed. The sketch gives sufficient detail for requirements of timber to be assessed. The four slots inside the walls of the paper rack are for use with light pegs which work freely and hold the paper at the sides sufficiently to keep it from being blown about.



A. R. GRAINGER,
Orchard Instructor, Christchurch.

FROM WAR TO PEACE . . .



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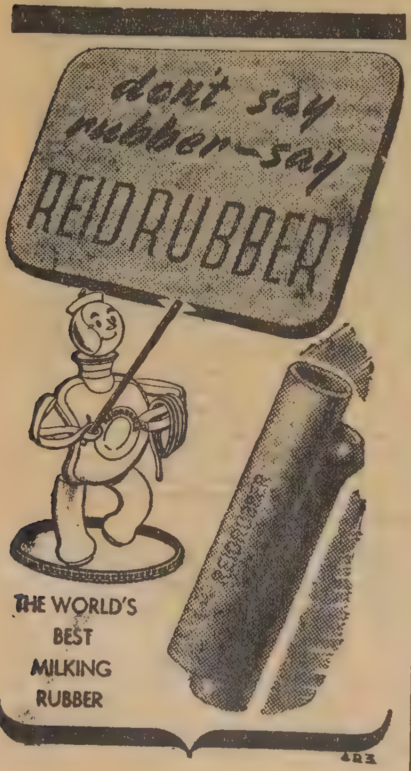

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PLEA FOR "BETTER EDUCATED COW"

Extraordinary Possibilities Claimed

THE best means of obtaining what he termed "an educated cow," or docility in milk production, was the subject of an address by Mr. H. J. Geddes, lecturer in animal husbandry at the University of Sydney, to the recent annual conference of the New South Wales Division of the Australian Institute of Dairy Factory Managers and Secretaries. "My main purpose is to plead for the better education of dairy cows," said Mr. Geddes. "Do not think me frivolous; I was never more serious in my life. The better education of dairy cows has extraordinary possibilities. It could save a lot of work and worry. It could go a considerable distance toward reducing the ravages of disease. It could increase dairy production. It could speed up milking; it could give better-quality dairy products. It could lower the cost of production of milk, butter, and cheese."

"NOW, these are high-sounding claims," Mr. Geddes went on. "If they are justified, you could hardly call me frivolous, could you?

"Perhaps I ought to be more explicit about what I mean by the educated cow; how the educated cow conducts herself in company; how we should educate our cows to fit them for their part in life.

Educated Cow

"The educated cow is seldom excited, except at the prospect of a change on to a fresh paddock. She has an air of quiet unconcern—that confident, well-bred look.

"She walks into the milking shed of her own free will and accord. She settles down to chewing her cud almost as soon as she is in the milking bail. She stands four-square. She does not require leg-roping.

"She permits herself to be washed and milked without protest—or at least without protest from tail or foot. She lets her milk down quickly and completely after washing, but not beforehand. She does not require stripping by hand. She seldom, if ever, suffers from mastitis. She walks through or backs out of the milking bail without fuss or rush. All her actions are deliberate and unhurried.

"You may protest that there is nothing unusual in such behaviour, nothing that calls for any high degree of scholastic attainment. You may also protest against the apparently extravagant claim that education of the cow could ever do anything to control that costly and troublesome disease, mastitis. Who ever heard of a cow being trained not to get mastitis?

'Dangerous Ground"

"Yes, I know I am on dangerous ground; but let me explain the arguments for education before you pass judgment.

"The primary aim of education is to teach the cow to let down her milk in the proper way and at the proper time. Research has brought to light several new facts concerning the mechanism of milk secretion.

"You can all recall the day—it is not far back—when everyone believed that the cow made milk at the time of milking. This belief, which we now know to be wrong, arose from failure to distinguish between the secretion of milk and the letting down of milk. Secretion and letting down are two distinct stages in the process of milk production.

"Secretion is the process by which the cells of the mammary gland manufacture milk from the raw materials carried in the blood stream. Letting down is the process by which the secreted milk is forced out of the tissues of the mammary gland. Secretion is a continuous process. Letting down occurs only at the time of milking, or at least it should occur only then.

Structure of Udder

"Let us consider these processes in more detail. Before we do that, however, we must refresh our knowledge of the structure of the udder. For present purposes we need not bother about the suspension. It is enough to consider the structure of a single quarter. The lowest part of the quarter is the teat, which is merely a fleshy tube with a narrow opening. Surrounding that opening is a circular ring of muscle which normally prevents the milk from dribbling out. When the cow is overstocked, that muscle may not be strong enough to prevent the milk leaking. A cow that is hard to milk often has an overdeveloped ring of muscle around its lower end.

"Above this muscle the opening widens out, forming the teat cistern. The teat cistern, in turn, communicates with the milk cistern, which is right up in the udder itself. Branching off or leading into the milk cistern are numerous tubes or ducts. These ducts branch in turn and the branches rebranch very much like the stems in a bunch of grapes.

"The total number of ducts is enormous; there are a million of them in a single cubic inch of udder tissue. Each duct ends in a tiny circular space called an alveolus. Each alveolus is lined with a layer of milk-secreting cells.

Function of Cells

"These cells extract the raw milk materials for the manufacture of milk from the blood stream, and after they have made the milk force it out or secrete it into the alveolus. This process goes on until the pressure of milk in the alveolus is equal to one quarter of the blood pressure.

"When the udder is inflated with air, as is commonly done in the treatment of milk fever, secretion is also stopped; but it is the pressure of air, not pressure of milk, that stops secretion.

"Secretion, then, proceeds until the back-pressure from secreted milk puts a stop to it. It does not begin again until the milk has been removed by milking or by the sucking of a calf.

"How is this milk which is contained in the alveoli got out of the udder? You will appreciate that this milk is deep in the udder tissues. When a cow first comes into the milking bail there is little milk in her teats or even in the milk cistern, but the top part of her udder is firm with secreted milk.

"The next stage is the letting down. Surrounding each alveolus is a tiny layer of muscle that contracts, when stimulated, and forces the milk down the duct and into the milk cistern.

Complicated Reflex

"The cow herself cannot make that muscle contract at will. Contraction is a reflex action controlled in a complicated fashion. In the teats of a cow are two sets of nerve endings: One set is sensitive to heat, the other to touch. Under natural conditions both are stimulated by the warm, wet, massaging action of the calf's mouth. When stimulated, the nerve endings send an instantaneous message to the pituitary gland at the base of the cow's brain. The pituitary gland thereupon discharges into the blood stream a substance called pitocin, which is carried back to the udder and has the power of causing these muscles around the alveoli to contract, so forcing out or letting down the milk.

"There is a distinct time-lag in this process. The message from the nerve

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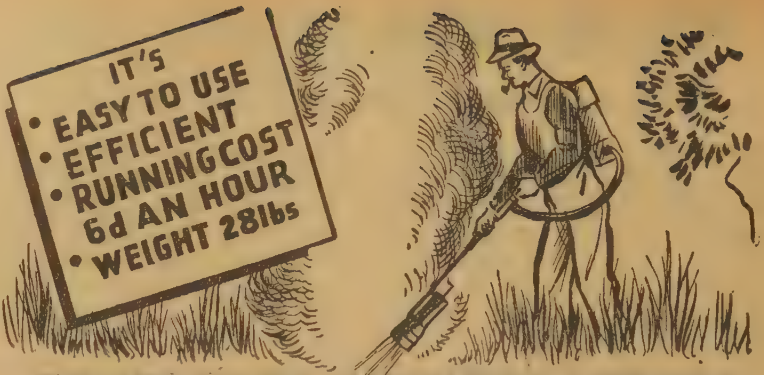

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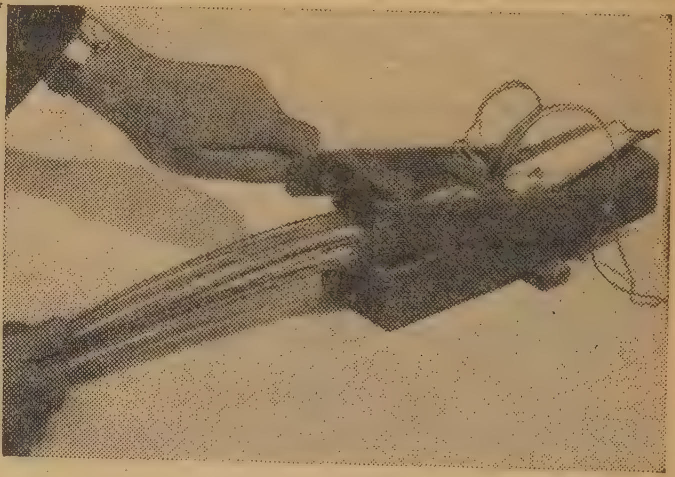

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endings to the pituitary is instantaneous, but it takes about 40 seconds for the actual letting down to occur.

"These letting-down muscles remain contracted as long as there is a certain proportion of pitocin in the blood. After a few minutes the level of pitocin in the blood falls so low that the muscles relax once more.

Effect of Washing

"In ordinary machine milking the act of washing the udder takes the place of the massage by the calf's mouth. Some cows, the hyper-sensitive cows, begin to let their milk down without having been washed. Their pituitary glands are stimulated into activity by the rattle of buckets or by being brought into the holding yard.

"The secret of quick, thorough machine milking is to get a strong, sharp contraction of the letting-down muscles. And that is mainly achieved by careful training of the cow.

"It seems that the pituitary gland operates most efficiently when it is called on to let down the milk only once in a milking; that its second effort is not as strong as its first. Peterson, of Minnesota University, who is one of the leading authorities on this subject, declares that it is important not to wash the cow more than a minute before the machines are put on to her, otherwise part of the original stimulus from the pituitary is lost.

"In fact, Peterson was able to reduce the production of cows by 20 per cent. in a fortnight merely by washing their udder 20 minutes before putting the machines on them. The normal rate at which milk production declines under good conditions is 4 to 5 per cent. per fortnight. Washing too soon accelerated the decline four to five times.

"I wonder how often cows have their chances of putting up decent records spoilt by such a simple thing as having their udders washed too long before the machines go on. I know of two dairies where it was the practice to bail up a whole shed full of cows, go along and wash the lot, and then start at one end with a bucket-type machine. The end cows were waiting up to 30 minutes in one of these dairies before being milked.

"Of course, that is not likely to happen in a walk-through shed with only a few bails, but how many dairymen put the machines on one cow and immediately wash the next cow, which has to wait at least four to five minutes before her turn to be milked comes around?

Quick Milking

"It is also important to get the machines off a cow quickly. Peterson claims that cows can be trained to let all their milk down in three and a half to four minutes. In fact, he has gone as far as to suggest that farmers should use a three-minute sand-glass to time each and to whip the cups off at the end of three minutes. He says that leaving the machines on the cow for a long time encourages her to spread the letting down of her milk over a long period.

"Peterson also advances another reason for getting the machines off quickly; that it reduces the chances of internal damage to the teat, which may end up in mastitis. He has measured the pressure inside the teat in hand milking, in machine milking, and in the suckling of a calf. He has also dissected hundreds of teats searching for evidence of internal damage as the result of improper milking methods.

"A calf in suckling exerts a pressure equal to 9 to 18in. of vacuum. A hand milker may exert a pressure equal to 22 to 35in. of vacuum. A milking machine exerts no pressure at all as long as the milk is flowing, but as soon as the milk flow stops the pressure inside the teat rises to the same level as that in the vacuum line.

"If the machine is left on the cow after the milk flow stops, it may cause damage in two ways: First, there are the congesting effects of the vacuum on the inner wall of the teat; and then there is the shearing effect of the cup as, because of the pulsation, it compresses the soft tissues at the top of the teat.

Mechanical Stripping

"What about stripping, which has been the subject of so much argument? Peterson recommends mechanical stripping—that is, the practice of bearing down on the claw for a few seconds before taking the cups off the cow. This extracts a little extra milk.

"Incidentally, he has a novel explanation for this effect. As the milk is removed from the cistern and the tension in the udder drops, the cups tend to crawl up the teats, so that they pinch off or shut off the flow from the milk cistern into the teat cistern. When the milker bears down on the claw he drags each cup down slightly and allows the milk duct to open up again. Peterson claims that mechanical stripping is better than hand stripping because it maintains the habit of letting all the milk down to the machine, because it is cleaner, and because it saves time.

"Much of the earlier argument that took place over non-stripping was fruitless; it failed to take into account the part that proper preparation of the cow and proper handling of the machines could play. A cow trained to let her milk down at the correct time and in the shortest possible time does not carry over much strippings. If the milk be got out of her while the letting down stimulus is still strong, the machines can get pretty well all the milk she has.

Mastitis Control

"How could this rapid method of milking help in the control of mastitis? The primary aim in rapid milking is to get the maximum quantity of milk out of the cow in the minimum time and with the minimum damage to the udder.

"It so happens that speedy complete milking does take the best care of the udder. Speed in a motor-car leads to rapid wear. Speed in milking has the opposite effect; its result is long wearing capacity. Peterson openly claims that proper machine milking, combined with rigid sanitation, will control mastitis.

"Dr. Bull, of the Council for Scientific and Industrial Research, leader of the team engaged on mastitis research in Australia, supports Peterson's attitude.

"A lot of people are pinning their faith on penicillin, but even if it turns out as well as the early trials suggest, it will be costly and it will be after all only a cure. Proper milking aims at the prevention rather than the cure of the disease.

"I am no authority on mastitis, nor do I wish to pose as one. I mention the subject merely because the control of it does appear to be one of the benefits of good milking.

Quantity and Quality

"How could better milking methods increase production? Peterson's work shows that incomplete milking accelerates the drying-off of a cow. Even conservative authorities are claiming increases of up to 10 per cent. in production merely from proper milking. An English farmer who has gone in for these newer methods of machine operation claims to have lifted his yield from 700 gallons a cow to 900 gallons.

"Would quality be improved? The reduction in mastitis would tend to improve quality. Mechanical stripping would give us a better-keeping milk and cream than hand-stripping. Most of the air-borne contamination that occurs in dairies must take place when the milker sits under a cow with an open bucket to hand-strip her.

"Of course, factory people have all sorts of fancy contrivances at their disposal today, but every one of you, I am sure, would welcome a change in milking methods that brought you in better-quality cream.

Creature of Habit

"So much for the case in favour of better milking. How are we to

BETTER EDUCATION OF DAIRY COWS . . .

educate the cow to her responsibilities? The cow cannot hold back her milk at will, but any excitement that upsets her may arrest the letting down and result in incomplete machine milking.

"The cow is essentially a creature of habit; she thrives on monotony; yet she is at the same time highly sensitive. She has to be trained to come into the bails without demur—that is, the milking process must be done with so little disturbance that she wants to come into the bail to be milked. It should be a pleasurable experience to her, not an ordeal. She has to be educated to like this mechanical calf that is foisted on to her.

"She should never be given the opportunity, if it can be avoided, to let her milk down in advance of the proper time. She should not be allowed to spin out the letting down of her milk. She should learn that the machines will not be left on her after the milk flow has ceased. She should be encouraged to let her milk down completely as well as promptly.

Early Training

"The training or education should start before the cow calves for the first time. If she is to go into the bails willingly, she should be encouraged to do so a month or two before calving.

"Those who engage in hand feeding can with advantage run springing heifers with the herd and feed them in the bail. It would often lead to a marked improvement in yield as well as accustom the heifers to going into the bails. This practice of putting them through the shed also gives the people in the dairy a chance to handle the heifers' udders.

"A device sometimes used to encourage a heifer into the bails after calving is to take the calf into the bails along with her and take it away from her through the door. She then tends to come into the bail looking for the calf.

"Another custom to encourage a heifer to let down her milk is to start her off with the calf and then push it up to her head while she is milked for the first time or two. In India it is the practice to milk the Zebus throughout their lactations with the calf at the head of the stall. Careful use of the calf might be a useful means of training a heifer in good letting-down habits; but if the practice is overdone, it might lead to trouble.

Use of Hot Water

"Peterson advocates the use of hot water, as hot as the hand can comfortably bear, for washing udders. He says that this helps to give a stronger stimulus to letting down and, thereby, more rapid and more complete milking.

"There is hardly any need to repeat the other points in training a cow to let her milk down properly—waiting until the machines are almost ready to be transferred from the other cow before washing the udder; bearing down on the claw as soon as the milk flow stops; pulling the machines off promptly as soon as the milking is completed.

"But I should mention the question of teaching the cow to milk quickly.

"Peterson asserts that cows can be educated to milk in three and a half minutes. He suggests that for the first few days a man should make a practice of pulling the machines off at the end of three and a half minutes whether the milk flow has ceased or not. He says the cow soon learns that milking stops at the end of that period and that she develops the habit of letting her milk down completely in three and a half minutes.

"The system works well with some cows, but not with others. But it is at least worth a trial for the sake of those that will respond.

Milking of Heifers

"I believe, but I have no dependable proof as yet, that it is important to milk heifers after the rest of the herd. I have an idea that arrangement will prevent to some extent the heifer getting into the bad habit of starting to let down her milk before she is brought into the bail and washed.

"No doubt there is still a lot to be learnt about the training of cows in the fine art of surrendering their milk, but the better knowledge of secretion and letting down that we owe to Peterson and other research workers has given us a surer foundation on which to build better educational methods.

"I believe that some further valuable contributions to the subject are likely to come from Whittleston, of the New Zealand Department of Agriculture. Whittleston has developed an ingenious electronic milk recorder that draws a graph of the rate at which a cow gives up her milk. This apparatus should give an answer to a number of problems that still await solution.

"I am afraid I cannot point to any work on the subject in Australia. Despite the size of the dairying industry in this country, we have not yet faced up to the necessity for research on the dairy husbandry side. But I spoke to you about that last year. We have not moved forward appreciably since then."

Facts About Wetas

THE following facts about wetas have been supplied by the Entomology Division of the Department of Scientific and Industrial Research:

1. They do not sting. In the female the large sting-like apparatus called an ovipostor is used solely for the purpose of egg-laying and by means of it eggs are introduced into cracks and other suitable places. If disturbed and annoyed, wetas will occasionally bite, and in the case of large specimens the jaws will pierce the skin. Apart from fright, a bite from a weta is not a serious matter unless, of course, infection of some kind results. As with all wounds, neglect may result in blood poisoning.

2. Eggs are deposited in suitable places, as on trees, and on hatching the young weta resembles the adult throughout its life. They frequently live in the abandoned tunnel of wood-boring beetles, and this tunnel is enlarged by the weta as it grows in size. They do not bore into wood as is popularly supposed, but make use of a tunnel already present. Another favourite home is under a strip of loose bark, a position particularly favoured on manuka. Although the life history of wetas has not been studied in detail in New Zealand, they live for several years, and generally they remain in the one situation throughout their existence.

3. The food is variable and depends to some extent on the situation in which the wetas are living. It consists of leaves of trees, a small amount of bark and sapwood obtained in the enlargement of their quarters, and in many cases some of the native grasses growing close by. One large colony situated in *Pinus radiata* trees subsisted entirely on native grass, since the *Pinus radiata* is an unpalatable food.

4. Wetas are not parasitised, though during the early stages small wetas may be eaten by birds or rats.

5. No useful purpose is gained in destroying wetas, as their greatest misfortune is their ferocious appearance.

7. The appearance of wetas in the vicinity of a dwelling is probably brought about through bringing firewood and stacking it close to the house. Under these circumstances, during their wanderings, they are likely to enter the building, and will cause a good deal of consternation by their presence. Under these conditions the wetas are far more anxious to escape than are the occupants to destroy them, and unfamiliar surroundings from which few exits are present will excite them and cause them to bite if handled carelessly.

IN THE HOME GARDEN IN DECEMBER

Planting for Late Autumn and Winter Supplies

> *"Nature never did betray the heart that loved her."*
>
> —Wordsworth.

. . . Nor will Nature disappoint the gardener who intelligently takes advantage of the opportunities she so lavishly places at his disposal. No known forces but those of Nature can produce in such abundance from tiny germ-containing seeds, and a good harvest will follow efforts to assist those forces.

By D. K. PRITCHARD, *Instructor in Vegetable Culture, Wellington.*

DURING December the main concern of the home gardener should be to ensure for home consumption adequate supplies of late autumn- and winter-maturing vegetables.

During late November and early December there is still time in favourable districts to sow seeds of late savoy cabbages and broccoli. Omega is the cabbage variety recommended. Lily White No. 1 and No. 2 are stated to cut in succession from June to August. Seed of borecole (Scotch kale) may also be sown.

Where seedlings have been grown and are ready for transplanting special care is necessary for successful resetting. The day before the seedlings are to be removed the seed-bed should be given a thorough soaking. When the plants have been grown in a box it may be placed in any kind of container large enough to hold it conveniently. If possible, the seedlings should be carefully removed by using a small trowel or flat piece of timber; this will conserve the entire root system, which will greatly assist the young plant to become more readily established. It will be an additional advantage if the seedlings are either "puddled" in, or the places where the plants are to be set given plenty of water. Above all, the seedlings should never be transplanted into dry soil and until the plants have become properly established they must be kept well watered.

Swedes.—Seed of this winter vegetable may be sown during December. If grown in part of the garden from which an early crop of potatoes has been removed, the soil may need only to be lightly turned over and superphosphate broadcast at 2oz. per square yard. The area should then be raked over and the seed sown ½in. deep in rows 12in. apart. If the weather is dry after the seed is sown, it is important that the surface of the bed should not be allowed to become dry. Laing's Garden and Superlative are varieties of swedes which are specially recommended for home gardeners.

Tomatoes.—The tomato crop must claim quite a lot of attention during December. It is unfortunate that this vegetable variety, which is of such economic importance in the ordinary household, is so subject to disease attacks. Correct cultural practices will, however, do much to lessen the incidence of infection and ensure vigorous, healthy growth of plants.

Mid-December is late enough to set out tomato plants in the North Island and late November or early December in most tomato-growing districts of the South Island, if the fruit is to have a reasonable chance of maturing before early frosts.

Plants which were set out in late October or early November should now be growing well. The soil about the plant must be maintained in weed-free condition by shallow hoeing. Deep cultivation may cause serious injury to the plant rooting system.

To obtain maximum development in the shortest growing period without forcing, all surplus shoots on staked tomato plants should be removed as soon as possible. Some dwarf varieties are given a light pruning, but nearly all dwarf plants are permitted to grow without removal of any growth. Spraying with Bordeaux mixture at 10- to 14-day intervals is necessary in most tomato-growing districts as a precaution against attacks of early and late blight.

All laterals on staked tomato plants should be removed as soon as possible.

Asparagus.—No matter what growth may develop on one-year-old crowns, no cutting should be done. From roots which are producing spears during their second year a light cutting may be made for 2 or 3 weeks and a week longer for 3-year-old plants. Irrespective of age, it is not advisable to continue harvesting beyond mid-December. As soon as cutting is stopped the bed should be thoroughly cleaned up, heavily manured, lightly hoed, and subsequent growth allowed to develop. Organic manures (blood and bone), soot, wood ashes, and a heavy dressing of properly made compost, or a mulch of well-rotted farmyard manure, will be suitable.

Rhubarb.—Harvesting of any variety of rhubarb which gives its heaviest yields in spring and early summer should stop about mid-December. Recommendations made above for asparagus will be quite suitable for rhubarb.

Carrots.—In districts where carrots have recently been attacked by the carrot rust fly sowing seed for autumn and winter supplies should be postponed as long as possible, but should not be delayed until there is insufficient time for the roots to grow to maturity. In favourable districts of the North Island mid-January sowing will allow sufficient time for good roots to be grown. In most parts of the South Island mid-December may be late enough for a main crop sowing.

Parsnips.—Seed for the main crop of parsnips may generally be sown from mid-November till late December, according to location. Fresh seed only should be used, and the quick deterioration of its germinating power makes it advisable to sow parsnip seed more lavishly than seed of most other vegetable varieties. Hollow Crown is recommended for home garden sowing.

Celery.—Plants from late September-sown seed should now be set out in the place where they are to grow to maturity. If special, high-grade heads are required for home use, it may be advisable to set the plants in a trench, a method which requires special soil preparation. The trench may be dug 12in. deep and the soil from it used to bank up the sides. Well-rotted stable or farmyard manure should be dug into the place where the plants are to be set, and covered with 3 to

THE HOME GARDEN IN DECEMBER . . .

[Photo News Ltd.

A main planting of leeks should be made in heavily-manured soil in December. Plants should be spaced 6 to 8in. apart in rows 12 to 15in. apart.

4in. of soil. Plants grown in this way become naturally blanched and seldom require artificial blanching.

It may be more convenient and less laborious, however, to set the plants in double rows, or in a bed, without any trenching. Plants set 12in. apart with the same distance between rows will afford ample space for hoeing.

Leeks.—To secure a winter crop of leeks it is not advisable to set the plants in light, sandy soil or heavy clay. The main planting is usually made in December. Wherever possible plenty of well-rotted stable or farm-yard manure should be dug into soil in which leeks are to grow. The plant is a gross feeder and will stand heavy manuring; 6 to 8oz. per square yard of blood and bone manure broadcast over the bed and worked into the soil before planting will give good results.

Don'ts

DON'T delay digging potatoes as soon as they are mature. In slug-infested areas delay in digging may mean substantial loss through the depredations of this soil pest.

DON'T hesitate to water copiously after applications of inorganic fertiliser.

DON'T neglect to spray tomatoes and celery with Bordeaux mixture. It is recommended as an efficient protection from attacks of blight.

DON'T continue to harvest asparagus and spring rhubarb after mid-December, as it is detrimental to the following season's crop.

Beans.—Dwarf varieties of beans should be kept well banked with soil to keep the plants upright and to prevent pods becoming unfit for use through coming in contact with wet soil. For continuation of supply a further sowing may be made at any time, provided the soil is not too dry.

Scarlet runners or other climbing varieties of beans must always be encouraged to climb up or around whatever support is provided. Where high winds are prevalent temporary fastening of the tendrils may be advisable.

Peas.—Support of vines of tall-growing, main crop varieties of peas is necessary if a full crop is to be harvested. In the absence of stakes or brushwood the top growth bends to the ground and provides a convenient hiding place and breeding ground for destructive pests.

As soon as pods and seeds have reached a usable size they should be picked, or the vines will begin to set seed and further pod production will be restricted. This recommendation also applies to all varieties of beans.

◆

STRAWBERRIES should be mulched with clean straw before the weight of developing fruit causes the trusses to bend over. The straw conserves moisture in the ground and prevents the fruit from touching the earth or being splashed with mud. In wet weather careful straw mulching prevents much rotting of the fruit.

Answer to Correspondent

Combating Potato Tuber Moth

B.W.F., Maunganui:

I had a crop of potatoes destroyed by the potato moth last season, and I would be pleased if you could tell me how to combat this pest. While the potatoes were growing and right up to the time of ripening there was no sign of the moth, but after the tops dried off the potatoes were affected. I sorted out what I could of the apparently sound potatoes and put them in a box with layers of lime on each row, but the moth went through the lot. Information on how to deal with the moth would be a boon to a lot of settlers in this district, also in Whakatane and other places.

FIELDS DIVISION—

There appears to be no feasible method at present of controlling the attack of the grub of the potato tuber moth once the potatoes are stored, and the only means of control is the prevention of attack in the first instance.

The potato moth is most prevalent in dry seasons, and will lay its eggs on any tubers on the surface of the ground. In free, dry soils it will even penetrate two or three inches to reach the tubers and deposit its eggs. The first essential for prevention of attack, therefore, is to have the crop well moulded up, particularly in dry seasons and with light friable soils.

Potato moths are also very quick to take any advantage offered to them by exposure of potatoes during digging, and under suitable conditions large numbers of moths have been observed over the newly-dug tubers. Thus, though all tubers already attacked by the grub may be discarded before storing, fresh grubs may hatch from the eggs laid during tuber exposure at digging time, which may completely ruin the stored tubers.

It is inadvisable, therefore, to dig potatoes when the moth is about. If this is unavoidable, the tubers should be picked up, bagged, and covered as quickly as possible. On no account should potato tops be used to cover the bags until they are sown up.

◆

BUDDING PIP AND STONE FRUIT TREES.

Budding is universally adopted as the best and most economical method of raising young trees. Budding is also the best way to rework old stone fruit trees which do not readily conform to grafting. Information on how to perform the money-saving operation of budding is contained in Bulletin No. 81, "The Budding of Pip and Stone Fruit Trees," which is available free from offices of the Department of Agriculture.

FARM WORK FOR DECEMBER

By the Fields Division.

PASTURES

Preparation for Grassing.—Land intended for grassing next autumn should now be in a firm, fine condition. If the land has not been worked down properly, it will be difficult to break up the lumps during dry weather. Frequently chain and tripod harrows are helpful in shaking down the lumps at this stage. Arrangements should be made for the purchase and delivery of grass seed. If early arrangements are made, samples can be secured in time for testing purity and germination before sowing. When ordering specify Certified seed, particularly ryegrass and white clover. In Canterbury land for sowing Italian ryegrass in January should now be firm and fine. If lime is to be applied, it should be sown a month or two before the sowing of grass, and arrangements should be made to have the lime on hand for this purpose.

Management of Pastures. — Next month, with the spells of dry weather which may be expected, grasses tend to run to seed-head and patches of these are generally neglected by stock, but cattle, and especially dry cattle, are helpful in cleaning them up. Patches allowed to run to this condition are lost for production for the remainder of the season, and tend to run to inferior grasses and weeds because the clovers are usually eliminated by the long growth. Topping should be practised with caution because excessive baring of the ground causes drying out of the soil and the formation of cracks.

Grass Seed Harvest.—Areas which were shut up for production of grass seed should be watched carefully to observe when they reach the right stage for harvesting; constant attention to this is well repaid. If cut with a reaper and binder, the grass should be carefully stooked and, when ready for harvesting, should be lifted carefully to prevent loss of seed. It is better for two forkers to lift the whole stook so that it is raised on to a sledge or low cart in one operation.

Management of Paspalum.—At this time of the year paspalum is growing very quickly, and, if allowed to get out of hand, will suppress white clover and ryegrass on which the farmer depends for winter and early spring production. Paspalum pastures, therefore, should not be permitted to get out of hand, and if they cannot be controlled by stock, the mower should be used. There is little danger in using the mower on paspalum swards in December.

HAY AND SILAGE

December is the chief month for cutting hay, especially on pastures containing a preponderance of English grasses. If cut later, the ryegrass and cocksfoot are beyond the stage for the production of the highest quantity of feeding value an acre. The only exceptions are fields of timothy, which may reach the optimum stage of production in January.

Care must be taken to see that the material is in a fit condition before haymaking is begun. Before beginning operations see that the harvesting gear is in good order. Accidents are caused every year in the hay-harvesting field by neglect of this precaution. Haystacks should be carefully watched to see that the temperature does not rise excessively. The temperature can be tested by pushing an iron spike into the heart of the stack and leaving it for a while before withdrawing and testing it with the hand. If the temperature does rise too steeply, it may be reduced by cutting "windows" into the sides of the stack or by turning the hay and restacking it in a new position.

Fields that contain a large quantity of paspalum may be shut up in November or early December for harvesting in January.

LUCERNE

Annual weeds may cause concern by their prolific growth in new stands of lucerne. Many of these weeds will not reappear after the first season and are usually not as dangerous as they appear. However, if there is real cause for concern, the area may be topped with the mower to cut the weeds. Some of the lucerne may be cut in the process, but little harm will be done to the plants.

Old stands usually provide a second cut during the month. After this cut the ground is usually too dry for cultivation, but if the soil conditions permit, cultivation with a penetrating implement may be given with advantage.

CEREAL GREENFEEDS

Sowings of maize and millet for greenfeed can still be made early in the month to provide autumn feed. Where crops for greenfeed are to be sown in the South Island in January, land will receive final preparation during December. Land for greenfeed to be sown in March should be ploughed as soon as the area is vacated by crops.

ROOT AND CRUCIFEROUS CROPS

Crops of carrots, mangolds, pumpkins, and early-sown swedes sown in 28in. rows should receive frequent intercultivation during the month to prevent weed infestation. Mangolds and swedes which are intercultivated should be singled.

In areas in the North Island where the climate is mild and moist, transplanting of mangolds should be carried out in December, if the mangolds are sufficiently large for the purpose. Do not transplant if the soil is dry; wait for rain to moisten it. Soft turnips sown now in the South Island will provide feed for stock next April and May. Swedes sown in November or early December will provide feed in June and July.

POTATOES

December is the time for digging new potatoes in southern districts. They are better lifted with a fork to avoid bruising of the tender skins, and they should be marketed as soon as they have been lifted. The main crop will now be ready for intercultivation. While the crop is young the intercultivation should be wide and deep; as the roots extend it should become narrower and shallower.

CEREALS FOR GRAIN

October-sown maize should be intercultivated and November-sown maize harrowed and then intercultivated to keep the crop free from weeds. A weed-free crop is important, not only for the yield but also for the prevention of a wet condition which predisposes the crop to disease and shelters insect pests.

STOCK

As the dry weather approaches the water supply should be carefully watched. The supply of water to stock during dry weather is of major importance, and an endeavour should be made to keep a good supply of fresh, clear water available.

Most calves will now be old enough for weaning, and they should be turned on to pasture to graze in rotation ahead of the dairy herd. If grass supplies fail, soft turnips can be fed to cows with advantage toward the end of the month. Soft turnips fed at this time of the year have a marked effect on the production of milk.

In the North Island lambs will be weaned in December. Before weaning pick out those which can be sold off the mother. The others should be placed on short, fresh, good-quality feed.

Quarters should be prepared for sows near farrowing.

GENERAL

Prepare breaks for feeding rape and summer crops. Where these are fed to cattle the electric fence is easy to erect and has proved suitable for the purpose.

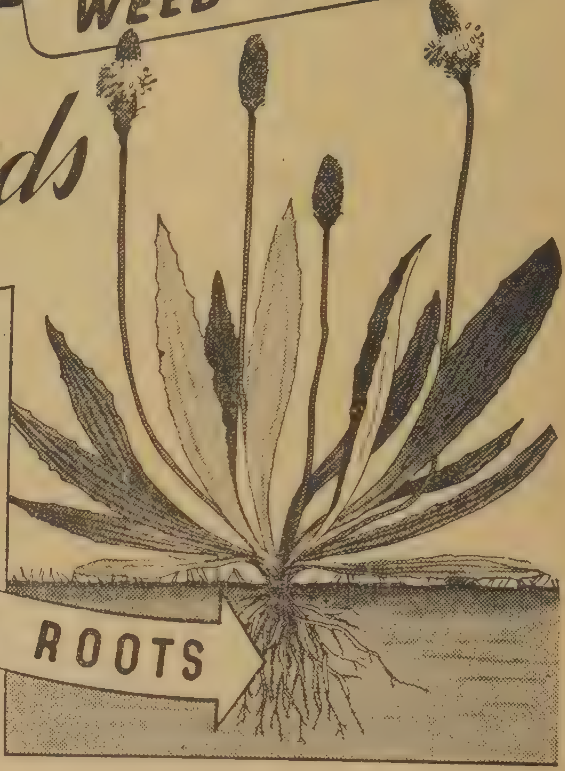
Have a final look over the cereal-harvesting machinery. Have on hand materials for dipping sheep, repair the yards around the dip, and clean out the dip.

WEEDONE

NEW HORMONE WEED-KILLER

Eradicates Lawn Weeds

RIGHT DOWN TO THE ROOTS



Extensive tests with WEEDONE (New Selective Hormone Weedkiller) in the U.S.A. have proved it lethal to most types of weeds, *but established lawn grass is unharmed* and the soil is not rendered sterile. WEEDONE spray enters the weeds through the leaves and penetrates *right down to the roots* and because of the changes which WEEDONE makes in weed cell structures the plants shrivel and die.

A trial conducted by the Horticulturist of the Department of Agriculture on a very weedy Wellington lawn gave spectacular results. Within a month all plantain, catsear, and white clover plants were dead, but the lawn grasses were unaffected. This lawn was so neglected that the Horticulturist considered that no other method would have been effective, short of digging over the whole area and re-sowing. Full details were given in the September, 1946, issue of the "N.Z. Journal of Agriculture".

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A Survey of Machine Milking

By W. G. WHITTLESTON, *Animal Research Station, Ruakura,*
and C. HOW, *Herd Consulting Officer, N.Z. Dairy Board.*

DETAILS of the machine milking methods used by a group of North Canterbury farmers taking part in a mastitis investigation carried out jointly by the New Zealand Dairy Board and the Department of Agriculture are given in this article. During the first season of this work observations were made but, with one or two extreme exceptions, no alterations were made to the machines. Throughout the final two seasons the machines were adjusted as circumstances permitted. The results set out give a picture of machine milking in a group of 20 "better-than-average" farms.

PRACTICAL contact with the farms in the survey has enabled the essentials for the servicing and adjustment of normal milking machinery to be determined.

Conditions of Survey

Machines.—Unless otherwise stated the machine is a releaser plant with double pipelines.

Pulsators.—Unless otherwise mentioned pulsators are of the individual type, and where doubled one valve serves two sets of cups. The ratio is that of squeeze to release, and the rate is given in pulsations per minute.

Gauges.—All readings are in inches of mercury.

Cups and Inflations.—Unless otherwise mentioned cups are of the soft inflation rubber-topped type.

Pumps.—The pump test is carried out as follows: With the pulsators running a ¼in. orifice is connected to the end of the air or milk line and the vacuum produced is noted. The gauge used is calibrated so that the vacuum may be converted directly into the number of cubic feet of air a second passing into the pump through the orifice at the vacuum produced. This figure, which may be called the "effective air capacity," gives an index of the amount of air displacement of which the pump is capable over the requirements of the pulsators and losses caused by leaks. The most convenient figure for comparisons is the effective displacement per set of cups.

Vacuum at cups.—Where possible this is measured by connecting the recording vacuum gauge to one of the teat cups while the other three are milking.

When the machine was first tested on one farm the results shown in the table at the top of the next column were obtained for the pulsator test.

Bail	Ratio
1	40 : 60
2	0 : 100
3	0 : 100
4	60 : 40

Inspection of the drive in bails 2 and 3 showed that the driving collars had slipped over a period until finally the pulsators went out of action completely. The process seems to have been gradual and had not been noticed by the farmer. The interesting aspect is that the cows became conditioned to milking without pulsation, apparently because the pulsators stopped working gradually. This is the first field observation of its kind made by the writers.

The shed was not well run and conditions were generally poor. Nevertheless the cows milked in bails 2 and 3 apparently milked normally.

First Season's Results

The table below summarises the conditions found during the first season of the work.

The most marked feature of the survey is that half of the relief valves were not working or faulty and half of the gauges were **in error by 1in.** or more.

		No. of machines
Pulsator performance:	Good	12
	Fair	8
Relief valves:	Not working .	5
	Faulty	5
	Fair to good ..	10
Gauge error:	Greater than 1in.	10
	Greater than 2in.	4
	Greater than 3in.	3
	Less than 1in.	[illegible]
Effective air-handling capacity of vacuum pumps (average):		0.059 cu.ft./sec./set of cups.
Average milking speed:		8.4 cows/hour/set of cups.
Average life of inflation:		8 to 9 weeks.

REPORT ON MILKING MACHINES EMPLOYED BY FARMERS CO-OPERATING IN MASTITIS INVESTIGATION : CANTERBURY.

NOTES ON TABLES: Relief Valve—C.S.P. = Covered spring poppet type; O.S.P. = Open spring poppet.

TYPE OF MACHINE.	PULSATOR. Ratio.	PULSATOR. Rate.	PULSATOR. Type.	RELIEF VALVE. Type.	RELIEF VALVE. Condition.	RELIEF VALVE. Blow-off Vacuum (not milking)—ins. mercury.	GAUGE. Error.	GAUGE. Max. Vac.	INFLATIONS. Life (weeks).	PUMP. (Standard Rotary unless noted.) Speed r.p.m.	PUMP. Effective Air Capacity (Cu. ft/sec./set of cups).	AIR ADMISSION.	COWS/ HOUR/ SET OF CUPS.	REMARKS.
5-cow single pipe single bail.	50:50	38	Rotary cylindrical.	Ball.	Blocked.	Not blowing off.	—3"	17"	6	228	.056	Clear.	10.2	
	50:50	41		"	Screwed up.	" " "	—2¼"	16"	5	224	.056	"	9.2	
	50:50	42		"	Blocked.	" " "	—2½"	14½"		236	.053	"		
	50:50	42		"	"	" " "	—3"	16½"	6	not obtained	.067	"		No alterations other than in pulley on motor. Rubberware was renewed, otherwise same.
	50:50	42		"	"	" " "	—3"	16½"	6	230	.060	"		
3-cow single bail.	47:53	38	Rotary.	Ball.	Working.	14-15"	—¾"	15"	5	234	Not measurable due to leaks.	Clear.	11.3	
	50:50	38		"	"	15-15½"	0	15½"		234	.070	Blocked in 1 bail.	12.0	
	45:55	39		"	"	15-16"	—¾"	15¾"		238	.073	All clear.		
	45:55	42		"	"	14-15"	—¾"	15"	5-6	235	.070	Clear.		Adjusted to blow off 14" on gauge.
	45:55	42		"	"	16-17"	—1"	17"	5-6	235	.070	"		No alterations made. New relief valve is to be fitted next season.
3-cow single bail.	24:76	44	Slide.	C.S.P.	Sticking.	17½"	—1"	16½"	6	220	.084	Clear.	11.0	
	25:75	44		"	"	Up to 22" before opening. Settling about 15".	0	15"	app. 6	225	.082	"	9.9	
		44		"	Leaks slightly.		0	13½"		230	.080	"		
	25:75	43		"	Sticking slightly.	14-18"	—	15"	6	220	.087	"		No alterations.
4-cow single pipe.	38:62	42	Slide.	O.S.P.	Poor.	Not working.	—6"	19"	6	227	.022	Clear.	6.1	
	29:71													
	50:50	42		"	Fair.	Screwed up.	0	15"	6-8	226	.018	"	5.0	
		46		"	Fair.	Working adjusted to blow off at 15"	0	15½"	6-8	270	.024	"		Not available as no cows were in.
	40:60	48		C.S.P.	Working.	14-15"	—	15"	6-8	270	.060	"		Slides adjusted to 30:70 ratio.
	30:70	50		"	Working.		—2"	16½"	6-8	270	.067	"		New C.S.P. relief valve adjusted to work at 14½"
3-cow single pipe.	46:54	43	Semi-cylindrical slides.	Ball.	Working.	14-15"	—¾"	15"	up to 20	219	.062	None.	6.2	
	40:60 One bail.	43		"	Just working.	15-17"	0	17"	up to 20	214	.074	Clear.	4.3	
	60:40	44		"	Working.	16½"	—½"	16½"		220	.070	"		Fitted new C.S.P. and put vacuum gauge at distal end of machine; worked much better this season. Adjusted to work at 15".
	30:70	44		C.S.P.	"	14-15"	—	15"	10-12	245	.087	"		
	30:70	42		"	"	16-17"	—	17"	10-12	220	.077	"		

REPORT ON MILKING MACHINES EMPLOYED BY FARMERS CO-OPERATING IN MASTITIS INVESTIGATION : CANTERBURY.

NOTES ON TABLES: Relief Valve—C.S.P. = Covered spring poppet type; O.S.P. = Open spring poppet.

TYPE OF MACHINE.	PULSATOR. Ratio.	PULSATOR. Rate.	PULSATOR. Type.	RELIEF VALVE. Type.	RELIEF VALVE. Condition.	RELIEF VALVE. Blow-off Vacuum (not milking)—ins. mercury.	GAUGE. Error.	GAUGE. Max. Vac.	INFLATIONS. Life (weeks).	PUMP. (Standard Rotary unless noted.) Speed r.p.m.	PUMP. Effective Air Capacity (Cu. ft/sec./set of cups).	AIR ADMISSION.	COWS/HOUR/SET OF CUPS.	REMARKS.
2-cow single pipe.	25:75	44	Slide.	O.S.P	Fair.	17"	—1"	17"	12	176	.066		10.8	
	25:75	44		"	Good.	17"	—1¼"	17"	12	175	.086	Clear.	11.6	
				"	"	14¾"	—¾"	14¾"		224	.065	"		
	25:75	44		"	Working.	14¾"	—¾"	14¾"	10-12	180	.090	"		No alterations.
	25:75	44		"	"	15"	—¾"	15"	10-12	180	.080	"		
3-cow single pipe.	30:70	44	Slide.	C.S.P.	Fair.	16"	—½"	16"	6	208	.060	Clear.		
	25:75	46		"	Good.	16-17"	—½"	16"	6	220	.080	"	8.4	
		44		"	"	14½"	+½"	14½"		214		"		
	25:75	46		"	"	15½"	—	15½"	6	220	.073	"		No alterations.
	25:75	44		"	"	15"	—	15"	6	225	.073	"		
4-cow double low line.	50:50	42	Rotary.	Large wtd.	Good.	12"	0	12"		275	.034	Clear.	4.5	
	50:50	42		" "	"	12½"	0	12½"	5	268	.034	"	6.8	
	50:50	42		" "	"	12½"	0	12½"	5	270	.033	"		
	50:50	42		" "	"	12"	—	12"		275	.033	"		No alterations.
	50:50	42				13"	—	13"		275	.033			
4-cow single pipe.	40:60:0 0:60:40	48	Slide.	Lever Type.	Poor.	Sticking 16-17"	+2"	17"	6	313	.060	Blocked bail 1. 1-16" in rest.	5.6	
	60:40	48		Ball	Blocked.	17"	+2"	17"		312	.056	Clear.		
	25:75- 35:65	48		"	"		+2"	15-16"		333	.056	"		
	35:65	46		"	Just working.	17½"	+2"	15½"	6	310	.060	"		Had machine overhauled and pulsator adjusted. Rubberware and joints have been renewed. Working better than at any time.
3-cow single pipe.	25:75	48	Slide.	O.S.P.	Fair.	17"	—1"	17"	8	283	.066	Clear.	8.9	
	35:65	48		"	"	16-17"	—1"	15½"	8	287	.066	"	9.9	
	25:75	52		"	Sticking.		—1"			270	.050	"		
	25:75	46		"	Sticking slightly.	16-18"	0	18"	8	285	.066	"		Adjusted to blow off at 15½". Tightened up belt on motor.
2-cow low level double bail.	49:51	40	Rotary.	Large wtd.	Good.	12"	No gauge	12"	6	240	.052	Clear.	6.8	
	50:50	44		" "	"	11½"	0	11½"	6-8	264	.050		7.3	
	50:50	39		" "	"	12"	0	12"		260	.038			
	50:50	40		" "		12"	—	12"	6-8	240	.055	"		No alterations.
	50:50	40		" "		12"	—	12"	6-8	240	.055	"		No alterations.
3-cow single pipe. Appr. set to	41:59	39	Rotary.	Ball	Poor.	App. 15½"	—1½"	15½"	App. 8	268	.060	Clear.	9.0	
	50:50	40		"	Just working.	14½"	—1½"	14½"	6 or more.	281	.068	"	8.2	
	35:75													
		42		"	"	17"	1½"	17"		293	.087	"		
	35:75	42		C.S.P.	Good.	17"	—1"	17"	6-8	280	.080	"		New C.S.P. relief valve above vac. tank. No other alterations.
	35:75	42		"	"	17"	—1"	17"	6-8	280	.080	"		

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	Ratio.	Rate.	Type.	Type.	Condition.	Blow-off Vacuum (not milking)—ins. mercury.	Error.	Max. Vac.		Speed r.p.m.	Effective Air Capacity (Cu. ft/sec./set of cups).			
4-cow, with 18" lift at raising can. appr.	47:53	43	Rotary.	Ball.	Not working.	—	—1½"	Indefinite.	20 (app.)	265	.036	Clear	8.8	
	50:50	44		"	"	—	—½"	15"	12	265	.046	"	9.2	
3-cow single pipe.	25:75	42	Slide.	O.S.P.	Fair.	17½"	—1½"	17½"	6	208		Clear.	10.4	
	25:75	40		"	Sticking slightly.	14½-15"	—1"	15"	8	200	.066	"	11.4	
	25:75	46		"	Fair.	17"	—1"	17"		276	.043	"		
	25:75	42		C.S.P.	Good.	17½"	—1"	17½"	6-8	220	.087	"		New C.S.P. relief valve.
	25:75	44		"	"	17"	—1"	17"	6-8	225	.077	"		
3-cow single pipe.	26:74	44	Slide.	O.S.P.	Not working.	—	—3"	18" appr.	8	211	.065	Clear.	9.5	
	22:78	46		"	Sticking.	18"	—3½"	18"	12 appr.	214	.070	"	8.7	
	25:75	44		"	Fair.	15½"	—3½"	15½"		212	.067	"		
	25:75	44		"	"	17"	—4"	17"	8-10	225	.067	"		No alterations.
	25:75	44		"	"	17"	—4"	17"	8-10	216	.067	"		Joint rings and rubberware renewed.
3-cow single pipe.	32:68	42	Slide.	C.S.P.	Sticking badly.	18½"	+¼"	18½"	8	186	.066	Clear.	8.0	
	33:67	44		"	Sticking.	Up to 17" falls to 15-16"	0	15-16"		182	.066	"	8.2	
		45		"	Good.	13½"	+¾"	13½"		200	.067	"		
	35:65	46		"	"	17"	+1¼"	15¾"	8	225	.087	"		No alterations.
	35:65	48		"	Sticking, not been working for 3 weeks.					220	.074	"		
3-cow low level double bail.	50:50	42	Rotary.	Sus. wt.	Good.	11-12"	0	12"	12-16 (moulded)	230 (super)	.042	Clear.	5.5	
	50:50	52		"	"	12"	0	12"	20 (soft)	188 (std.)	.028 rising to .036 when pul. slowed.	"	3.3	
	50:50	40		"	"	11½"	+1"	11½"		216	.030	"		
	50:50	44		"	"	11"	—	11"	Soft.	197	.030	"		No alterations.
3-cow low level double bail.	50:50	38	Rotary.	Large wtd.	Good.	11"	—½"	11"	8	230	.034	Clear.	6.0	
	50:50	38		" "	"	10-11"	—½"	11"	8	250	.032	One blocked.	7.0	
	50:50	39-40		" "	"	10"	—1"	11"	8	235	.022	Clear.	6.0	
	50:50	40		" "	"	10"	—1"	11"	8	250	.037	"		No alterations.
	50:50	40		" "	"	10"	—1"	11"	8	245	.035	"		
2-cow single bail,	27:73	48	Slide.	C.S.P.	Sticking; blows off when tapped.		—½"	15½"	8 or more.	172	.086	Clear.	14.4 15.0	
	25:75	46		O.S.P.	Sticking.	13"	0	13"	12	168	.078	"		
	25:75	46		"	Rusted badly.	14"	0	14"		166	.028	"		
	25:75	46		"	Working.	15"	0	15"	10-12	165	.090	"		All rubberware and joints renewed as suggested.
	25:75	45		"	"	16"	0	16"	10-12	165	.090			

In the light of experience so far it has been found desirable to have an effective air-handling capacity of at least 0.06 cu.ft./second/set of cups. Eight of the machines, including all of the four doubled-up plants, do not reach this standard.

Soft inflations under average farm conditions tend to lose their efficiency after about six weeks' use. In general, the farmers concerned did not pay as much attention to the changing of inflations as is desirable.

There is a tendency for improvements to be made, such as speeding up of pumps and the installation of better relief valves. One interesting point is that in some cases even though the pump was speeded up the effective air displacement did not improve. That shows how important are leaks of various kinds.

From the figures obtained during the first examination a highly-significant relationship was found between the effective air displacement and the rate of milking. When all the factors influencing speed of milking are considered, the importance of air displacement will be realised. But to maintain safe operating conditions with good displacement a good relief valve is needed. Hence stress must be placed on correct pump speed, no leaks, and a good relief valve.

Servicing Equipment

From these results an attempt can be made to suggest the minimum requirement for the servicing of milking machinery. The following equipment has been found convenient and portable:—

Test gauges: Two good-quality Bourdon-type gauges are mounted on rubber cushions in a box with a transparent top. The gauges are fitted with a tap and one is calibrated in air flow for a ¼in. orifice as well as vacuum. The use of two gauges serves as a check, but they are tested regularly against either a mercury column or a weighted tester.

¼in. orifice.—This is a length of 1in. tube fitted with a ½in. side tube and a plate in the end in which a ¼in. hole is drilled. (For details see Department of Agriculture Bulletin No. 214). By the use of this orifice with a vacuum gauge the effective capacity of the pump can be found.

Revolution counter.—This is used to check the speed of the pump, in conjunction with a watch with a seconds hand.

This equipment is all that need be carried. Either a mercury gauge or a weighted tester must be used as a check for the Bourdon gauges. The weighted tester may be carried about if desired and connected to a car engine intake manifold or to a milking machine vacuum pump as a source of vacuum.

Method of Testing

The following rough schedule is convenient in giving a machine a general check-over:—

Assemble the machine completely, shut off all milk taps, and start the pump. Note the vacuum produced and examine the relief valve to see if it is sticking. A test of the relief valve which is helpful is to raise the vacuum gradually by shutting off a milk tap slowly. Note the reading. Hold the valve closed and let the vacuum mount as high as possible. Release the valve, and the vacuum should come to the same value as previously.

Plug the ¼in. test orifice (connected to the test gauges) into the end of the air line or similar convenient place within sight of the gauge and reach of the relief valve. Block the orifice with a finger and note the test gauge readings. Hold the relief valve closed and remove the finger from the test orifice. Note the air-flow readings. **(Note that the pulsators are running throughout these tests.)**

Replace the normal plug in the end of the air line. Time the pulsators and check pump speed. Examine air-admission holes and the state of inflations and rubber tubes.

Examine pulsator slides for undue wear and incorrect setting. Much air can be lost from worn slides.

If the relief valve is in good mechanical order but sticks, take it apart and clean it thoroughly. Put a drop of oil in the guide, smear oil over the spring, and reassemble the valve. Set it so that with the pulsators running and the milk taps shut the vacuum is 15in. This sets the upper limit.

Full details of the requirements of the different components may be obtained from the bulletins on milking machines published by the Department of Agriculture.

The following points give a guide in interpreting the results of these tests:—

The pulsator speed should be between 35 and 45 pulsations a minute. The air displacement/set of cups should be 0.06 cu.ft./sec. The following pump speeds are suggested (rotary pump 7in. x 6½in.):—

	R.P.M.
2-cow plant	200
3-cow plant	235
4-cow plant	260
5-cow plant	270
6-cow plant	290

When the machine does not give the correct amount of displaced air at the recommended pump speed it is likely that joints are leaking or pulsators faulty.

For a thorough check on pulsators and milking efficiency a recording vacuum gauge is essential. However, in the light of experience in the present work it is felt that with the simple equipment described much can be done to help the farmer keep his machine efficient.

Shed Technique

A detailed examination was made of shed methods in handling 14 of the 20 herds in the investigation. Eight were not hand stripped, and on two of these neither leg-ropes nor back chains were used. Where non-stripping has been adopted there has been no observable loss in production. The owner of one of the best of the group (herd average about 470lb. of butterfat), who during the past season tried non-stripping with six heifers chosen at random, is about to adopt a non-stripping technique. With few exceptions those who do not hand strip make a practice of pulling down on the cups before removing them (machine stripping).

The machines used by the non-stripping farmers are in no way special. In fact all sorts are included —low-level milk pipe, vacuum-break, and simple releaser plants. There is no evidence that the machine need be of any special design to milk efficiently without stripping. Good mechanical condition is the only requirement.

Despite a great variation in the condition and efficiency of the milking machines examined, no relation could be found between the over-all efficiency of the machines and the incidence of mastitis.

Summary

The components most frequently found out of adjustment are the relief valve and vacuum gauge.

Commonly-needed adjustments are the speeding-up of the vacuum pump and the elimination of leaks.

There is a significant relationship between the effective air-handling capacity of the vacuum pump and the rate of milking. This is influenced by pump speed, leaking joints, and inefficient pulsators.

A satisfactory check of a machine can be carried out with a pair of check gauges, a standard ¼in. orifice, a revolution counter, and a watch.

Hand stripping may be eliminated with any sort of machine if it is in good mechanical condition.

Photograph by Sparrow Industrial Pictures Ltd.

Intercultivation and Weeding

IN growing crops there is no practice which contributes more to success than proper intercultivation and weed control. Nothing on a farm is more unsightly to those who know what it means to produce a good crop economically than a weed-infested crop.

JETHRO Tull in "Horse Hoeing Husbandry," published in 1731, wrote that "tillage is manure," and the advantage resulting was a freeing of the soil particles. He believed that the soil was the only food for plants and that the plants fed on the minute particles. Therefore it was reasoned that the more finely divided the soil, the better would the plant be nourished.

At the beginning of the nineteenth century the conception of plant nutrition was based on the assimilation of chemical elements from soil minerals, organic matter, water, and air. The reason for cultivation was then given as increased aeration, which in turn increased the oxidation of chemical compounds to make them more available for plant use. Other theories were later put forward such as (a) stirring and mixing the soil to change the relationship of soil in regard to moisture, temperature, and plant food; (b) deep cultivation to allow roots to penetrate deeply for nutrients and water; (c) the chief benefit was control of weeds; (d) the primary aim was to pulverise and stir the surface of the soil after being hardened and caked by rain.

Today the following reasons for cultivation are held by many:—

1. Destruction of weeds.
2. Conservation and storing of moisture.
3. Aeration of the soil.

Weed Control

The prime factor in reducing intercultivation work to obtain weed control is good ploughing and skilled cultivation before sowing or planting of the crop. "Skilled cultivation" means the doing of the right job at the right time with the right implement. All are not in a position to possess a range of implements to meet the requirements of all soils on their farms, but it is possible to attain the same result with careful working of the more simple implements.

It should be the aim to germinate as many weed seeds as possible just before sowing or planting, and to stir the surface soil layer slightly to kill these with the harrows. On some soils in a dry period rolling will bring the moisture to the surface in sufficient quantity to cause germination of certain bad weeds such as red root (*Amaranthus* spp.).

Intercultivation should begin soon after the crop rows are easily distinguished, when any weeds present are usually at the right stage to kill by cultivation, particularly when the weather is dry. Many heavily weed-infested soils are in districts where it is exceedingly difficult to attain a good kill on account of the heavy moisture content and sticky nature of these soils, and in such cases one should question the wisdom of growing crops, particularly in those parts of New Zealand where grass production can be relied on for almost all requirements.

It has been found from experiments carried out at Rothamsted, England, that with potatoes there is no advantage in intercultivation in the absence of weeds. Where weeds were present there was a very marked sensitivity of the potato crop to competition. Experiments in the United States on maize crops confirm this and indicate the full importance of weed control. Trial crops with the same seed-bed preparation showed an average yield over an 8-year period of 7.3 bushels per acre where weeds were allowed to grow, as against 45.9 bushels per acre where weeds were kept down.

The removal of weeds whether by hand hoe, by pulling, or by careful use of the cultivator has been proved to be the major factor in increased yields.

Moisture Control

Cultivation directed at weed control has a bearing on conservation of moisture as well as on aeration. This tends to be more in evidence on heavier soils and those which become hard and baked on the surface. Cultivation beyond that needed for weed control appears to be not so necessary on the freer types of soils.

Very light cultivation on the top inch or two of soil at the most is sufficient to conserve moisture in periods of dry weather. With the variety of tines and shovels available on cultivating equipment it is possible to work up a good surface soil mulch. On sticky or heavy soil types the larger shovels should be avoided and use made of the chisel-teeth type. Where the soil is relatively free the shovel type can be safely used.

As well as loss of moisture through evaporation there can be a loss through surface run-off. The mulching of the surface layers will reduce this to a minimum.

It is desirable to have a granular soil mulch rather than a fine or dust mulch, as a granular mulch is not so likely to form a crust after a shower and also breaks the capillary rise of water more effectively.

Aeration

A well-aerated soil is most favourable for bacterial activity. Air is also necessary for certain chemical and physical changes in the soil in making plant nutrients more available and improving tilth. Cultivation stirs and turns the soil in such a way as to keep the air well distributed. Again, the greater effect of cultivation on aeration is found with the heavier types of soil. The beneficial effect of cultivation on aeration is less marked with the more open types, hence the need for more careful cultivation of crops on heavier and more sticky soils.

It is apparent that intercultivation is necessary in producing a good crop, and it is much more profitable to grow 1 acre well than 2 acres of only half a crop. For aeration the number of cultivations required will vary with conditions; in dry seasons it is necessary to cultivate more frequently than in wet seasons.

The depth of cultivation depends on the type of crop and the soil. Where root crops are grown cultivation can be deeper with little danger to the roots, but in a crop such as maize there is real danger of pruning surface roots which extend for long distances near the surface. It is interesting to note that at whatever depth the maize seed is planted the crown or secondary rooting system always develops at about the same depth, just below the surface. It is on this root system that the maize plant depends during its later growth. Cultivation sufficiently deep to prune these roots will reduce the ultimate yield of the crop. With these roots so near the surface it is evident that shallow cultivation is all that is required.

Experiments so far carried out have shown very important differences in favour of shallow cultivation, and it would appear generally that cultivation as often and as deep as is necessary to control weeds is best.

If in the cultivation of crops the aim is to keep all weeds destroyed and to keep the surface of the soil mulched, it is necessary to cultivate as soon after each rain as practicable. The time and number of cultivations required by any crop will vary with the season and the soil.

J. R. MURRAY,
Instructor in Agriculture, Hamilton.

BEEKEEPING IN NORTH AUCKLAND

BEEKEEPING in North Auckland is little different from beekeeping in other parts of the Dominion. The same basic principles apply and any beekeeper with a sound knowledge of bee behaviour and general beekeeping practice can succeed there. In this article R. S. Walsh, Apiary Instructor, Auckland, deals with the main nectar sources of the Northland beekeeper and discusses problems peculiar to the district.

THE first hive bees (*Apis millifica*) to reach New Zealand arrived in 1839 in the care of missionaries who landed at Hokianga, so that district can rightly claim to be the fount whence sprang the important and successful honey industry of today. As in the days of the missionaries, the predominant sources of nectar in North Auckland are the native bush and manuka (*Leptospermum scoparium*), although the advance of settlement with its accompanying land development is resulting in the steady clearance of bush and scrub and their replacement by grasslands and pasture, which have greater appeal to present-day beekeepers.

The flowering period of the numerous plants, trees, and shrubs may differ by as much as a month in various parts of the north. On the east coast bays only a few miles north of Auckland it is not unusual for the bees to have gathered a super of manuka honey before any nectar is available from this source in the Whangarei district, one hundred miles north. It is in the coastal areas throughout the north that the earliest nectar flows are experienced.

Manuka Honey

Complete crop failures are unknown in Northland, but there are seasons when little honey other than manuka is produced. When beekeepers speak of manuka they refer only to the red-wooded species. Another species of manuka (*Leptospermum ericoides*), the tree manuka, is spoken of by beekeepers as "white tea-tree," the wood of this type being white. It is not considered an important honey plant and some beekeepers are of the opinion that it does not bear nectar. However, bees have been seen working it, and the nectar has been noticed glistening in the corolla of the flowers. White manuka also yields honey dew, but fortunately not heavily and it seems to come only from odd trees. It is usually necessary to examine a good many trees before the sticky exudation is noticed sparkling on a sooty trunk.

Method of Extraction

The viscid nature of manuka honey makes its extraction from the comb difficult. It is usually obtained only by the use of an implement known as the pricker pad. This is simply constructed, but extraction by this method is tedious. Most prickers are made large enough to treat one-third of a comb at each manipulation. It is essential, however, to make them slightly larger than necessary to cover this area of comb.

The materials required are a piece of five-ply 7½in. x 10in. and sufficient 1¼in. fine nails to pierce each cell, a ½in. piece of timber the same size as the five-ply, four ¼in. bolts, and two handles. A sheet of comb foundation is laid over the five-ply to mark the positions to be drilled for the nail holes. When this is completed and the nails are embedded, the ½in. board is bolted to the five-ply and the handles screwed into position at either end of the board.

It requires a little practice before the pricker can be used to the best advantage. The nails must not be forced through the mid-rib of the comb, but inserted to a depth which just allows the comb's resistance to be felt. A see-sawing motion is used when pressing the nails into the honey, as the object of pricking is to break up its jelly-like consistency. Both sides of the comb are pricked. A satisfactory type of stand on which to rest combs for the purpose consists of a metal tray with a raised centre. The honey that drains from the comb is held in the lower portion of the tray. When not in actual use the pricker stands in a steam-jacketed container where the nails are kept warm by immersion in heated honey.

Heavy Toll on Life of Combs

This procedure requires a good deal of extra work and takes a heavy toll on the life of extracting combs. Experts in the use of the pricker pad manage to extract about 75 per cent. of the honey or 35lb. per super. In some districts manuka honey seems to be much easier to extract than in others. There appears to be no doubt that the colour and flavour of this type of honey are influenced by soil variations and also by the intensity of the honey flow. Manuka appears to secrete nectar under climatic conditions that would be entirely adverse to almost every other nectar-bearing plant, and as a result there is a little nectar available throughout the year in some area in the north. Probably the most important single factor that will curtail the secretion of nectar by manuka is the influence of cold winds.

The density of manuka honey makes straining difficult, and this, coupled with the problems of extraction, entails more work than is necessary in other classes of honey production.

Heath, in full bloom in July, provides a valuable mid-winter nectar flow in North Auckland.

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Nevertheless, the honey is much appreciated in the north and the appeal of its rather pronounced but not unpleasant flavour is reflected in its ready sale in areas where it is produced.

Mid-winter Nectar Flow

Pink heath (*Erica baccans*) is found in small isolated patches in a number of North Auckland districts, but around Dargaville there is a great expanse of this valuable honey plant. Hundreds of acres of heath cover an area of poor country between the Wairoa River and the west coast. It comes into flower early in June and yields nectar lightly by the end of the month, but it is during July and August that the flow is at its height. When heath is in full bloom the hills across the Wairoa River from the main north highway are a blaze of pink against the skyline.

The great value of this plant is just beginning to be recognised by beekeepers. The weather is seldom suitable for other than the shortest of flights by the bees during the flowering period, but heath yields so well that despite this handicap the bees derive great benefit from it. Hives divided in the autumn and left with just sufficient stores to tide them over the intervening weeks will, when placed on heath, build up into strong colonies and gather sufficient honey to carry them through until the usual spring nectar sources are available. Heath honey can be extracted, is medium amber in colour, and has a flavour suggestive of well-cooked marmalade.

Manuka can generally be relied upon for a light flow in the month of July in northern parts, but it is not of sufficient intensity at that time to allow for any reduction in the normal amount of winter stores, which should be left on the hives.

Apiary situated in heath country with heath in full bloom surrounding the hives.

Spring Sources

There are few native trees in New Zealand incapable of secreting nectar, although in some species the bees have difficulty in gaining access to it. The majority of native trees can be regarded as only minor sources of nectar, but there are a few which yield so heavily that where sufficient of them are growing together the honey gathered is unmixed with that from other sources and is considered to be the main crop. Although their contribution of honey may be small, there are many trees that supply the bees with large quantities of pollen. Totara (*Podocarpus totara*) and hinau (*Elaeocarpus dentatus*) are splendid spring sources, while houhere (*Hoheria populnea*) or ribbon wood and koromiko (*Hebe salicifolia*) are invaluable sources of late autumn pollen. In the extreme north bees work mangrove (*Avicennia officinalis*) in the late autumn for nectar and gather pollen from it until well into the winter. The puriri tree appears to be somewhat of a mystery. It flowers practically throughout the twelve months and the flowers appear to be designed by Nature to attract bees. Drops of nectar can be shaken from the flower into the palm of the hand at any time of the year and yet the bees do not appear to be attracted by this seemingly perfect blossom. The writer has kept a strict watch on these trees for the past few seasons, but has not yet seen bees working on them.

Importance of Early-flowering Trees

Ample supplies of early nectar have a profound influence on colony development at its most critical stage, and the importance of the principal nectar-secreting, early-flowering trees is realised by North Auckland apiarists, who endeavour to have their bees located within easy flight range of those that flower in August and September. These are yellow kowhai (*Sophora microphylla*), konini or tree fuchsia (*Fuchsia excorticata*), and the introduced straight willow (*Salix fragilis*). A sure indication that the bees are working fuchsia is provided when they are observed bringing in the unique, bright-blue pollen associated with this tree. Other minor spring sources whose slightly-varying flowering periods provide the hives with the stimulus required to build up large colonies early to meet the manuka flow are five finger (*Nothopanax arboreum*), rangiora (*Brachyglottis*), kumarahou (*Pomaderris elliptica*), spiny hakea (*Hakea acicularis*), and bush lawyer (*Rubus australis*).

The main flow of nectar from manuka begins during September in some northern areas, but it is not until October in most districts that it yields heavily; there are some localities where the flow is not at its height until November. Cabbage tree (*Cordyline australis*) yields well in October, and in alternate years sometimes provides a surplus, but the honey is not of a quality that would justify its extraction. During the same month nectar is secreted by hakea (*H. saligna*), a tree that makes an excellent hedge or wind-break. The honey obtained from it is of outstanding quality, but in an average locality the honey from this source is unlikely to be distinguished from other honies being gathered at the same time. At Keri Keri, however, this species of hakea exhibits prolific growth and attains an exceptional height and depth. Most properties in the Keri Keri district are enclosed by hedges of this type and the flowers are in keeping with the rest of the tree, blooming luxuriantly and secreting large quantities of nectar. High winds prevail in the district during the flowering period, but good crops of honey could be gathered from this source if hives were distributed along the length of the hedges on the inside of the properties, where they would be protected from the winds.

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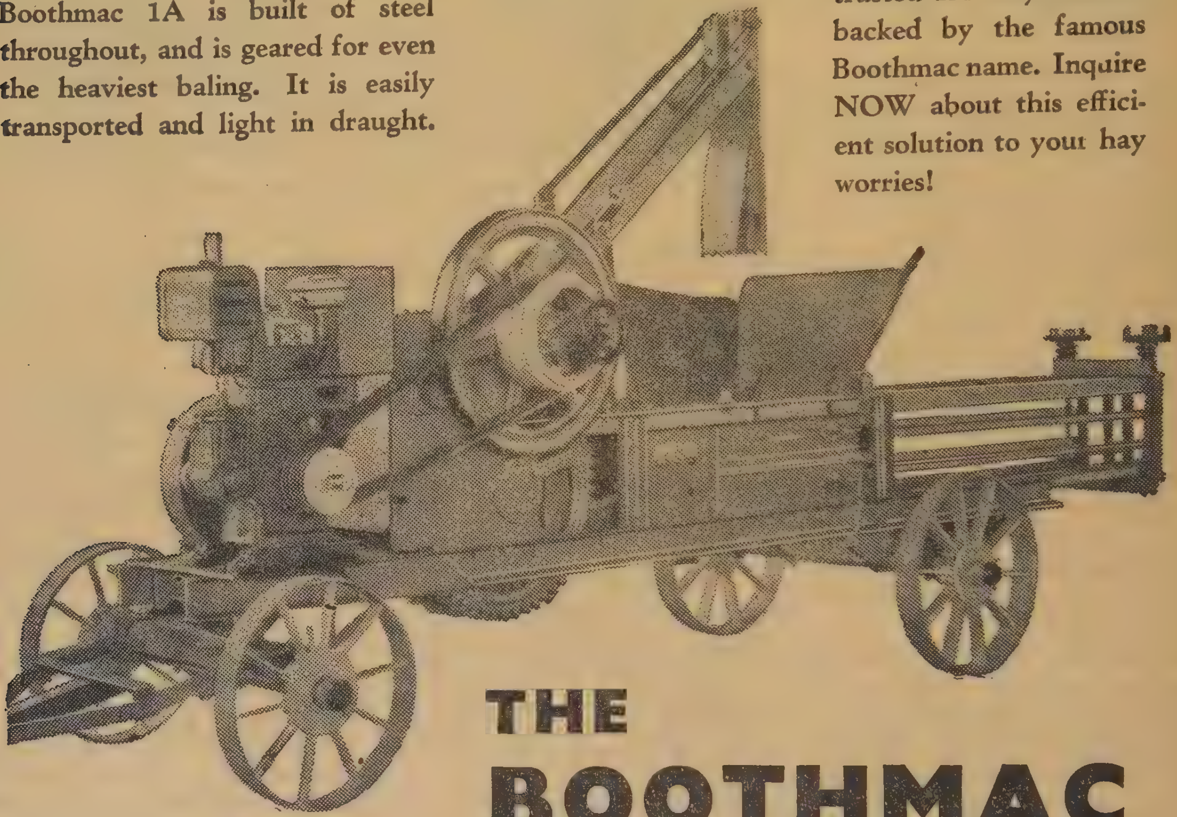

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Summer Flow

Each year there is an increase in the amount of clover and mixed pasture available to the bees. Land development is proceeding rapidly and in suitable seasons a considerable quantity of clover honey is produced. This is seldom available as a straight line, however, as the flavour and colour are influenced by the many other minor sources yielding at the same time. The flavour of manuka honey can usually be detected in honies harvested later because of the practice of returning combs that held the manuka crop to the bees to provide storage room for the later honies.

Some of the best honey is produced in the Whangarei County, where land development has been proceeding longer than in other areas. There is some splendid volcanic country in this area on which clover grows profusely, but contrary to results obtained from similar soil in other districts, it yields only lightly and the crops secured are rather disappointing. The heavier country, particularly that of drained swamps, gives by far the best returns, and limestone country, of which there is no large area, also yields well. The honey produced from manuka grown on limestone country is of a noticeably milder flavour.

The commencement of the clover (*Trifolium repens*) flow in North Auckland fluctuates considerably according to location. It begins from mid-November in some areas, and as late as mid-December in others. There is a good deal of buttercup (*Ranunculus acris*) in North Auckland and, like clover, nectar secretion begins at different periods according to the locality. On the Ruawai Flats on the west coast the amount of buttercup is remarkable. A panoramic view of the flats from the nearby hills presents a memorable sight when the buttercup is in flower, the whole area appearing as a carpet of the deepest yellow.

Rewa rewa (*Knightia excelsa*) gives a good flow of nectar in some years, but is unreliable. It appears to yield best during wet seasons. The honey from this source extracts cleanly, is medium amber in colour, and has a slightly caramel flavour. Tawari (*Ixerba brexioides*), which is said to be the most beautiful flowering tree in New Zealand, yields nectar from October until the end of December. Large quantities of excellent honey were at one time harvested from this source, but unfortunately the trees have been greatly decimated in the north. *Lotus major* is a sufficiently important honey plant in North Auckland to entitle it to be listed as a main source. It appears to thrive on the clay soil of that district. Minor but valuable sources of honey in North Auckland are dandelion (*Taraxacum officinale*), catsear (*Hypochoeris radicata*), hawkweed (*Crepis capillaris*), and blackberry (*Rubus fruticosus*).

Pohutukawa

Although pohutukawa (*Metrosideros excelsa*) grows very well inland, it is found in large numbers only on the sea coasts. There are very few apiaries located for the express purpose of harvesting this class of honey. This is rather difficult to understand, as pohutukawa honey is one of the easiest to extract and in liquid form is water-white in colour. Its flavour is very pleasant and, once a taste for it has been acquired, milder-flavoured honies do not give the same satisfaction. Pohutukawa honey is one of the quickest granulating honies in New Zealand. It will granulate in the combs within 2 weeks and in the tank within 24 hours. In seasons when granulation is delayed beyond this period the honey sets with a very coarse grain.

Pohutukawa honey provides poor winter stores, as the bees must collect water during the winter with which to secure the necessary sugars from the granules. They will frequently throw the crystals out of the hives and regather them when they have become partly liquefied by exposure. Probably the largest single area of trees now in existence is on Rangitoto Island, a little over half an hour by launch from Auckland City. Crops exceeding 200lb. a hive have been recorded there. Another splendid stand of these trees is to be found at the Whangarei Heads.

High winds during the flowering period considerably shorten the flow, as the blossoms are blown from the trees. There are several varieties of pohutukawas, and where a number of varieties grow in one area the flow is prolonged, as the different species flower in succession. Last season there were some trees in flower on Rangitoto Island over a period of two months. A shortage of pollen on the island prevents colonies building up early in the season.

Rata Vines

In the remaining areas of heavy native bush in North Auckland rata (*Metrosideros robusta*) still flourishes. A surplus from this source is obtained by apiarists who have their bees located right in the bush areas. There are few beekeepers today, however, who rely mainly on bush sources, most of them preferring to locate their hives where the bees can work manuka, and later clover and other pasture sources. In North Auckland ratas sometimes flower in June, but from October onward is the normal period for this locality. The white-flowered rata vine (*Metrosideros albiflora*) is responsible for a good flow of nectar in late November. The honey is of good quality, although it possesses a rather pronounced flavour.

Minor Bush Sources

Mahoe (*Melicytus ramiflorus*) or whitey wood is a heavy yielder and has an extended flowering period beginning in late October, but is found only in dense bush. Nikau palm (*Rhopalostylis sapida*) provides a good minor source of nectar, which is gathered by the bees in January, as is the honey from whera whera or towai (*Astelia Banksii*). Whera whera usually grows in the forks of large trees well above the ground. The honey from this parasite has a most unpleasant flavour. The same applies to the nectar of kie kie (*Freycinetia Banksii*), which flowers in early spring.

Pennyroyal (*Mentha pulegium*) flourishes in North Auckland and the honey from it can be detected in the lighter class of honey extracted at the end of the season. In a district where consumers are accustomed to pronounced flavours there is no objection to pennyroyal honey, which is inclined to improve the grain of any honey mixed with it.

Superiority of Italian Bees

It is necessary in North Auckland to begin the spring overhaul of colonies earlier than further south. Colonies headed by black or hybrid queens will begin preparation to swarm in September, but Italian colonies are not inclined to swarm more than they do elsewhere, nor can the black or hybrid colonies compare favourably with the Italian in other respects. The average crops harvested by Italian bees are superior and are most marked in poor seasons when the bees have to search assiduously to secure a surplus.

Gable Lids

The gable top roof has a number of adherents who claim for it certain advantages in permanently-established apiaries under North Auckland conditions. High temperatures predominate in North Auckland during the summer and adequate ventilation for colonies is essential for beekeeping in that district. Gable lids allow a freer circulation of air, and when hives are at peak strength during the hottest part of the season the bees cluster above the mats inside the gable lids. Undoubtedly this relieves congestion in the brood chambers and makes for easier manipulation. It also reduces the numbers of bees killed when the lids are replaced.

Showers of rain are frequent during the spring months and the field bees are usually working the available nectar sources when they occur. As the natural instinct of honey bees is to return to their hives when rain bursts upon them, many are trapped at the hive entrances by the water that is directed on to the alighting boards when flat-topped lids are used, but the gable lid directs the water away from the entrances down the hive sides. Another advantage claimed for this lid is its provision of good ventilation during the winter and its assistance in maintaining dry conditions in the hive. The gable lid offers adequate air space above the colony, and gauze-covered holes at either end allow for the escape of moisture-laden air before condensation occurs.

Queen Rearing

Queens can be reared in North Auckland from September until May, but, unless apiaries are located well away from bush areas, it is rather difficult to secure pure matings owing to the prevalence of dark drones. Commercial queen rearing is to be undertaken on a large scale during the coming season and several thousand queens and many hundreds of nuclei are to be bred for sale to all parts of the Dominion. The possibilities of package bees are at present being investigated, and if the outcome proves satisfactory, a considerable trade may eventuate.

Mild Winters

It has been noticeable during the past winter, which has been exceptionally mild, that many colonies retained their drones. Bees are active throughout the winter and do not cluster as in the colder parts of the Dominion. Colonies headed by good queens usually have three or four frames of brood in mid-winter months. Although there are virtually two honey flows in a season, queens reared in the district from stock that has been long established there appear to do equally as well in their second season, and it seems to be quite certain that queens introduced during the spring are at their best in the spring of the following year. The fact that colonies remain on the same sites for both the manuka and clover flows probably accounts for their ability to harvest crops from two distinct sources without any apparent loss of vitality by either bees or queen. Colonies wintered with the honey supers left on the hives do not suffer any apparent detrimental effect and it is a decided advantage to leave supers on until after April, as the larger wax moth (*Galleria mellonella*) is extremely active in the autumn.

Winter Stores

In average years 40lb. of honey is sufficient to carry colonies through until the spring. It is under only exceptional circumstances that sugar feeding becomes necessary. The severe drought of last summer, which dried up the pastures and killed outright many native trees, was responsible for hives running short of stores in the late winter. Consequently there were few areas where some artificial feeding was not required.

Disease

North Auckland beekeepers are fortunate in that they do not have to combat disease to the same extent as apiarists in other districts. *Bacillus larvae* is found only occasionally and in widely-separated areas. There are some commercial beekeepers who have never experienced it. It would appear that foul brood does not develop and spread in this warm and humid climate to the extent it does in the colder parts of the Dominion.

Controlling Humidity

The larger beekeepers in North Auckland are realising the necessity for taking preventive measures to combat the detrimental effect that the humid atmosphere of the district has on their honey, and they are erecting suitable buildings and rooms in which humidity and temperature can be controlled. A complication associated with the storing of combs in rooms where a high temperature is maintained is the incredible rate at which the larger wax moth breeds, and the rapidity with which it can destroy a stack of combs under these artificial conditions is remarkable.

Many smaller beekeepers are at present extending their operations and others are settling in the north for the purpose of taking up beekeeping as a means of livelihood. There are at present about 1913 registered apiaries containing 16,648 hives in the Auckland apiary inspection district.

Those contemplating taking up beekeeping in Northland should first visit the district so that the available country and conditions generally can be closely examined. It should be understood that equipment is unprocurable there and that the difficulties of transportation are considerable. Until recently it was impossible to purchase bees in the district and even now the supply is limited. To establish an outfit that would provide a reasonable living would, under present circumstances, require the investment of a disproportionate amount of capital.

Show Dates

December 3, 4—Gore A. and P. at Gore.
December 7—Wyndham A. and P. at Wyndham.
December 7—Motueka A. and P. at Motueka.
December 7—Tokomairiro A. and P. at Milton.
December 10, 11—Southland A. and P. at Invercargill.
January 1—Nuhaka A. and P. at Nuhaka.
January 10, 11—Wairoa A. and P. at Wairoa.
January 11—Blueskin A. and P. at Waitati.
January 17—Waikouaiti A. and P. at Waikouaiti.
January 24—Palmerston-Waihemo A. and P. at Palmerston.
January 24, 25—Taumarunui and District A. and P. at Taumarunui.
January 25—Helensville A. and P. at Helensville.
January 29—Tauranga A. and P. at Tauranga.
January 29—Marton A. and P. at Marton.
January 30, 31—Hawke's Bay Ram Fair at Napier.
January 31, February 1—Horowhenua A. and P. at Levin.
February 1—Waipukurau A. and P. at Waipukurau.
February 1—Katikati A. and P. at Katikati.
February 1—Clevedon A. and P. at Clevedon.
February 1—Rodney Agricultural Society at Warkworth.
February 4, 5—Feilding A. and P. at Feilding.
February 6, 7—Feilding Ram Fair at Feilding.
February 7—Waiwera A. and P. at Waiwera.
February 7, 8—Taranaki A. and P. at New Plymouth.
February 8—Woodville A. and P. at Woodville.
February 8—Te Awamutu A. and P. at Te Awamutu.
February 8—Hukerenui A. and P. at Hukerenui.
February 11, 12—DannevirkeA. and P. at Dannevirke.
February 12—North Kaipara Agricultural Association at Kaipara.
February 13—Dannevirke Ram Fair at Dannevirke.
February 14, 15—Franklin A. and P. at Franklin.
February 14, 15—Pukekohe A. and P. at Pukekohe.
February 15—Pahiatua A. and P. at Pahiatua.
February 15—Whakatane and Rangitaiki A. and P. at Whakatane.
February 19—Opotiki A. and P. at Opotiki.
February 19, 20—Ohura A. P. H. and I. at Matiere.
February 21, 22—Masterton A. and P. at Masterton.
February 21, 22—Auckland Metropolitan A. and P. at Auckland.
February 22—Ohura A. and P. at Ohura.
February 24, 25—Masterton Ram Fair at Masterton.
February 26, 27—Rangitikei A. and P. at Bulls.

Making Good-quality Hay

EARLY CUTTING ADVISABLE

By **G. A. BLAKE,** *Instructor in Agriculture, Matamata.*

QUALITY as well as quantity should be aimed at in haymaking. Good-quality hay cannot be made from poor pastures producing mainly inferior types of grasses such as fog and sweet vernal. Pastures of this type are usually weedy, and feeding out of hay from them results in the spread of weeds to better pastures. The cutting of the same area year after year is also poor field husbandry, resulting in an open sward deficient in clovers and bottom grasses. Where possible, paddocks for haying should be rotated.

THE majority of hay harvested is cut too late through farmers waiting until the seed is well developed, with the mistaken idea that it is necessary and beneficial to reseed a paddock through handling of the hay. At this stage of growth much of the nutriment has been utilised for seed formation, and the straw is fibrous and indigestible.

Time to Cut

Hay should be cut, weather conditions being favourable, when the bulk of the grasses are in flower. Clover crops or cereals and vetches are cut when partly in flower, but oats alone when in the milky stage. Lucerne is cut when about one-tenth of the crop is in flower, or when new shoots begin to appear at the base of the plants. Delay in cutting results in loss of leaf and the retarding of the subsequent growth.

Difficulty in dividing crops containing a high proportion of subterranean clover, or in those that have become badly lodged, can be overcome by attaching an elongated finger to the outside divider of the mowing machine.

Curing

The curing of hay aims at a reduction in the moisture content from 80 per cent. to 18 per cent. and the retention of the natural colour and all the nutrients. Allowing the hay crop to remain in the swath until dry enough to harvest results in the over-drying of the top layer and a large loss of leaf.

Wind is a better drying agent than the sun, and every endeavour should be made to lift the hay and allow the wind to blow through it. Early use of the hay tedder or swath turner can result in a day less being needed to dry the hay, an important consideration if rain is imminent.

Because of the labour involved, cocking has gone out of favour, but for the making of good lucerne hay cocking should still be practised to minimise the loss of the valuable leaf. In inclement weather hay can be cocked greener than it can be stacked, and can remain cocked for several weeks before stacking.

Experience is the best guide in deciding if hay is ready for stacking, but if a handful is twisted three times and breaks off, the crop may usually be stacked with safety. If too wet, heating occurs and may result in the stack being lost by fire. If the hay is less heated, the stack settles unevenly and water often enters, causing further loss.

Harvesting and Stacking

With the advent of the pick-up baler, stacking is fast losing ground as a method of storing. Ease of handling and calculation of the ration are two features of baled hay. Baling may be carried out when the hay has slightly more moisture than is allowable for stacking, but the bales should then be stood on end in stooks to dry out thoroughly. If bales are stacked in a shed, air passages should be left for ventilation, but if they are stored in the field, a dry site accessible in all weathers should be selected and logs or branches used for a bottom. Outer walls should be vertical with each layer interlocking over the layer beneath, while the roof should be ridged and well capped with loose hay to turn all rain.

In stacking loose hay the stack should be made long and narrow rather than square, which allows further drying out with less risk of fire. Where weather conditions are unfavourable the building of several small round stacks rather than one large one will ensure the safety of at least some of the crop, and less hay is exposed when feeding out. Round stacks should be high with a small base. The size to make an oblong stack for a particular field can be calculated from the fact that 1 ton of hay occupies 12 cubic yards when newly stacked and only 8 cubic yards when well settled.

Protection

Probably more hay is lost or wasted through inadequate protection against stock than is spoilt by rain. When a winter supply of supplementary fodder is saved every precaution should be taken to ensure its safety. A good stock fence should be placed far enough away from the stack to deter animals trying to reach over it.

Protection from rain is best secured with corrugated iron, but where this is not available thatching is almost as effective. A well-raked, steep roof covered with a sack cover is sufficient to shed ordinary rainfall. Dutch barns provide excellent protection from the weather, but unless the hay is baled, much time is lost in carting to a central depot.

[Green and Hahn Ltd.

Baled hay should be stood on end in stooks to dry thoroughly.

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J. D. BAYNE, Secretary, TE KUITI.

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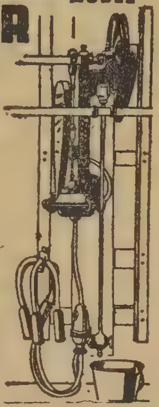

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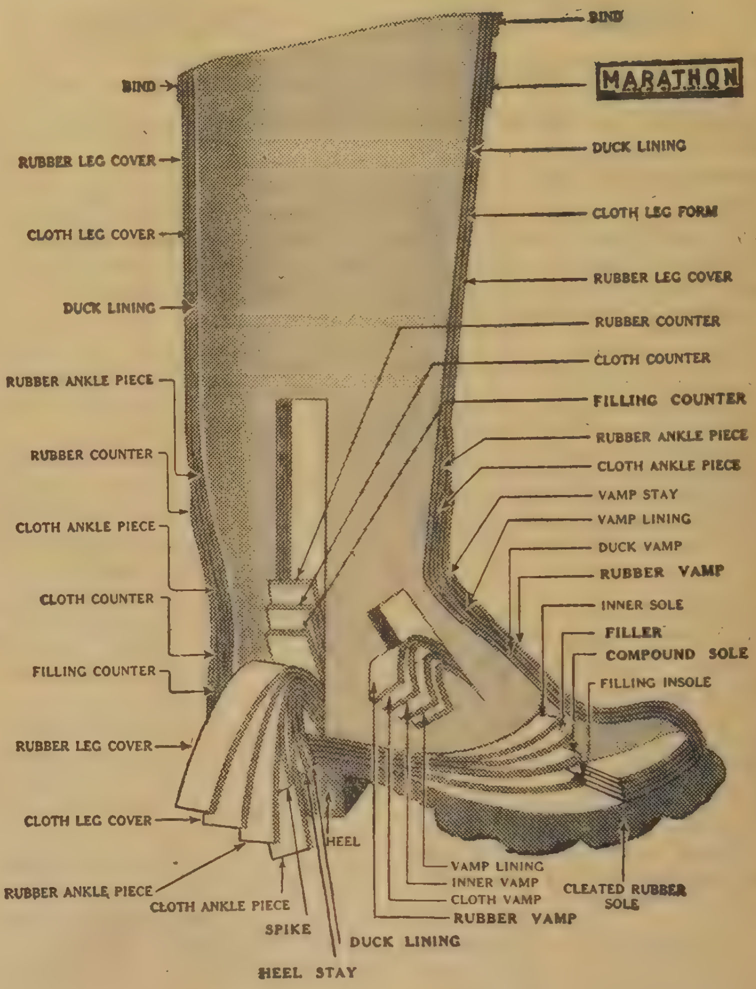
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BIND
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CLOTH LEG COVER
DUCK LINING
RUBBER ANKLE PIECE
RUBBER COUNTER
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CLOTH COUNTER
FILLING COUNTER
RUBBER LEG COVER
CLOTH LEG COVER
RUBBER ANKLE PIECE
CLOTH ANKLE PIECE
SPIKE
HEEL STAY
DUCK LINING
HEEL
DUCK LINING
CLOTH LEG FORM
RUBBER LEG COVER
RUBBER COUNTER
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FILLING COUNTER
RUBBER ANKLE PIECE
CLOTH ANKLE PIECE
VAMP STAY
VAMP LINING
DUCK VAMP
RUBBER VAMP
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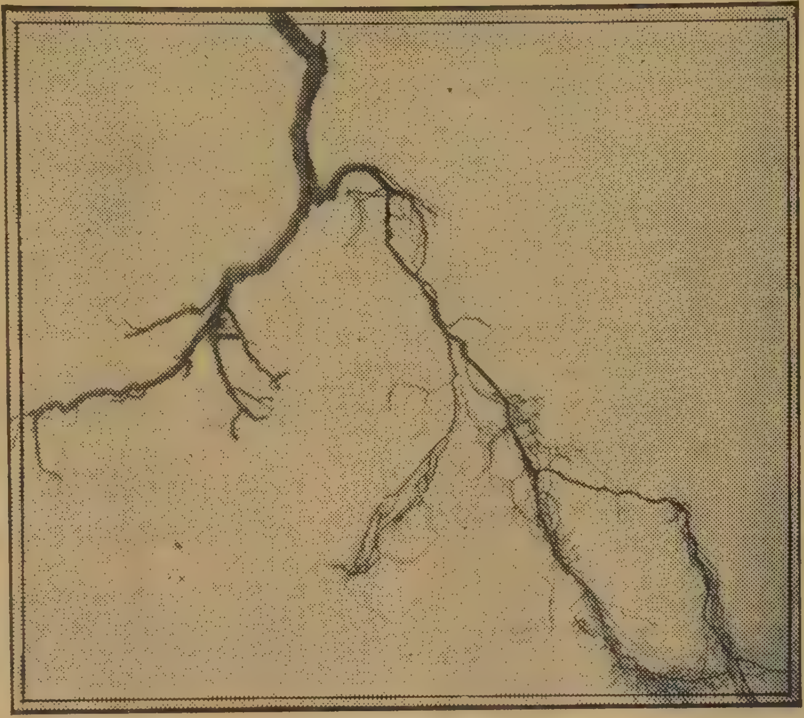
Good Production from Small Fruits Entails Care in Early Summer

CARE in cultural operations during the early summer and attention to some essential details of management can mean the difference between a poor and a good crop of small fruits. Guidance for the home gardener and commercial grower of small fruits is given in this article by J. P. Hudson, Horticulturist, Wellington.

Raspberries can crop heavily only if they are ensured a continuous supply of moisture during the critical summer months when the berries are forming. If the roots dry out at this time, the crop will be light and consist only of small, hard berries. One way of conserving moisture is to cultivate regularly in the summer, to keep the surface in a fine state of tilth, and kill weed seedlings before they have time to rob the soil of an appreciable amount of water. Since, however, many of the raspberry feeding roots are very near the surface, summer routine should consist only of shallow hoeing or cultivation, and special care should be taken when using a rotary hoe to prevent it cutting too deep and so damaging the root system. **Every broken root means a proportionate reduction in the weight of fruit picked, and the loss is greater if the summer is dry.**

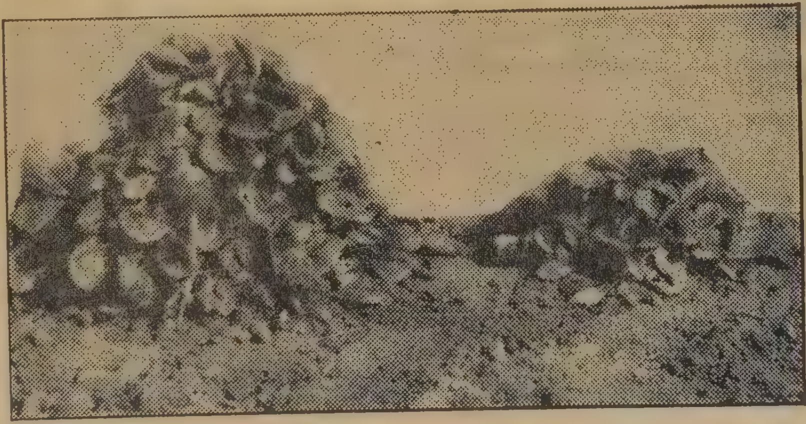
Another way of conserving soil moisture is to apply a thin surface mulch of rotted manure, straw, compost, leaves, or lawn mowings. This helps to keep the soil cooler and moist, and will ultimately work into the surface layers where, by increasing the humus content, it will enable the soil to absorb and hold a greater proportion of the rainfall. Commercial raspberry growers who cannot obtain enough of the mulching materials suggested above should consider growing a small area of green crop or grass expressly for the purpose of mowing it and carting the green material on to the raspberries.

The third method of ensuring a constant moisture supply is by watering in the home garden or the use of an irrigation system on a larger scale. Few commercial raspberry growers have facilities for irrigating their gardens, and it is doubtful whether the cost would be justified where the soil is deep and the roots are tapping the considerable reserve of moisture available in the lower levels of the



[*Photo News Ltd.*

Grass-grub is one of the most serious pests of the raspberry. The root shown here clearly indicates the effect of grass-grub injury. On the left a grass-grub, found feeding on the root when it was dug up, has eaten off every feeding root from many inches of the main root system. On the right the root is clothed with the normal number of feeding roots.



Strawberries are commonly affected by a virus disease, generally called "yellow-edge" from one of the most noticeable symptoms of the disease. The yellow edge around the leaves cannot, however, be clearly seen at all seasons of the year, but a general flattening and stunting, as shown in the right-hand plant above, is usually an indication that the plant has the disease. Such plants should be ruthlessly dug out and burned, since they will never bear a useful crop, cannot be "cured," and only infect other plants with the virus disease. On no account should runners ever be saved from an infected plant, even though it seems only "mildly attacked" (in the early stages of attack), since all the runners will be seriously affected.

soil. Where raspberries are growing in relatively shallow soils, or where a rising winter water-table leads to annual loss of the deeper roots, irrigation would probably pay a handsome dividend except in wet summers.

The aim in watering should be to wet the soil to a depth of up to 10in. at each application. It is useless just to moisten the surface. Each thorough watering should be followed by cultivating as soon as soil conditions permit to loosen the surface and prevent it from caking.

Strawberries in the Home Garden:—If new plants are not required, the runners should be pinched off as they appear, since they take a certain amount of strength from the parent plant. Where new plants are needed it is always best to use only the first one which grows on each runner, pinching off the runner beyond this plant. As soon as these selected new plants are rooted they should be lifted and planted out in next year's fruiting bed. Since this involves planting at a time of the year when dry weather is to be expected, the young plants should, if necessary, be watered in and kept watered until they are thoroughly established. From this early planting the strawberries should be thoroughly established by winter and should crop well the next season.

It is common commercial practice overseas to take both blossoms and runners off plants in the first season, thus building up large vigorous plants which bear a heavy crop in the second season after planting, and usually crop for two further seasons before being ploughed in. The advantage of very early planting, as described in the previous paragraph, is that the plants are sufficiently well established to crop in the first season after planting.

Grass-grub.—The familiar cream-coloured grubs with brown heads found in a curled-up position when dug out can cause very serious loss of crop in small fruits, especially on raspberries and strawberries. If raspberries are noticed to be flagging in hot weather or seem not to be thriving as they should, a few random samples of earth and roots should be dug up to see how many grass-grubs are present. If the raspberry roots are found to be devoid of small, hairy feeding roots, and if grass-grubs are found in the soil alongside the stripped roots, there will be no difficulty in deciding on the culprits. Raspberries have been dug up which had been so heavily attacked that there was not a single fibrous root on the whole root system, although a few newly-appeared, adventitious roots showed that the main roots were still healthy. Such plants could not, of course, be expected to carry a crop. In other cases, where about a tenth of the feeding roots had been eaten by grass-grubs, the plants looked vigorous, yet had, presumably, been weakened to some extent by the loss of roots.

Many raspberries and strawberries which are apparently healthy and cropping normally are probably capable of producing much heavier yields if grass-grub damage could be reduced or avoided altogether. The pest is a hard one to control, since its incidence varies from year to year, and a garden apparently free one year may be heavily attacked in another season. Regular and thorough cultivation through the summer months helps to reduce the pest by enabling birds to get at more of the grubs and by mechanical injury to the grubs themselves, but most of them are in layers of soil which cannot be penetrated by cultivators because of risk of injuring the roots.

A dressing of 3cwt. of arsenate of lead powder an acre, applied dry and worked into the surface soil, will account for a considerable proportion of the grubs. Since it is insoluble in water the dressing remains effective for some time—probably several years.

Curing Deficiency of Boron in Fruit Trees

By I. L. BROWN, *Orchard Instructor, Christchurch.*

INVESTIGATIONS into losses of fruit crop and debility of trees in many cases have shown the cause to be a boron deficiency. Methods of rectifying this lack of one of the minor elements used by plants have therefore been under trial, with very satisfactory results.

ONE orchard in Central Otago has shown outstanding results where boron has been applied to the trees by including its application in the routine operation of spraying.

In 1932 the existing apple trees were in such poor condition that a large percentage of the crop was not marketable. The Sturmer variety was particularly poor, only a quarter of the fruit being fit for sale.

Borax Applied in Spray

The trouble was diagnosed as boron deficiency, and a trial application of borax to the Sturmer trees was made in 1934 at the strength of 2lb. of borax to 100 gallons of the combination spray of lime sulphur, colloidal sulphur, and lead arsenate. It was applied three weeks after the calyx spray, when the young fruit was well formed and the foliage well developed. The borax was mixed with the spray by dissolving it in water and adding the solution to the spray tank after the combined spray had been mixed. A second application at the same strength was made three weeks later.

When the fruit was harvested the improvement in the quality of the apples was most pronounced. The fruit no longer showed the pitting, distortion, and cracking characteristic of boron-deficient fruit, and the percentage of high-grade fruit was greatly increased. Almost all the apples harvested were marketed.

Improved Tree Growth

The applications were repeated the following season, and not only did the fruit maintain its improved quality, but the growth of the trees also showed improvement. These encouraging results decided the orchardist to apply the treatment to the Jonathan trees, which, though producing good fruit, were not making satisfactory growth of young wood, and like the Sturmers had not shown any response to other treatments intended to renew their vigour. The borax application, however, produced marked improvement in both the growth of the trees and the quality of the fruit.

The supply of boron was continued by the use of 2lb. of borax to 100 gallons of spray mixture for the next few years until 1939, when, as a result of research elsewhere, the amount of borax used was reduced to 1lb. to 100 gallons. The treatment has since been extended to all pip and stone fruit in the orchard and has become an annual practice in the spraying routine. The trees have maintained good growth and fruiting habits, and from a poor, debilitated state have become highly productive, the successful results being attributed to the application of boron.

Vaccination Against Contagious Abortion

THE campaign for control of contagious abortion by calf vaccination was commenced in 1943. The numbers of calves vaccinated each year have increased steadily as shown by the following figures: 1943, 18,000; 1944, 40,000; 1945, 110,000; 1946, 160,000, or approximately 50 per cent. of the dairy heifers in the Dominion. The results have been consistently good. The 1945 calving returns from 1,266 herds show that there were 2.6 per cent. of abortions from all causes in 16,075 two-year-old heifers which had been vaccinated as calves, whereas in the previous year there had been 22.3 per cent. of abortions in 17,098 unvaccinated heifers in the same herds. Results were also available in 1945 for 6,537 second pregnancies in heifers vaccinated as calves. In these three-year-old heifers only 2.8 per cent. of abortions occurred. It therefore appears that the immunity from calf vaccination lasts through at least two pregnancies.

So far vaccination has been provided free, but as the work has now passed the experimental stage, the Government feels that it is only reasonable to make a charge to cover cost of vaccine and the travelling involved. In consultation with the New Zealand Dairy Board and the Dominion Federation of Farmers' Veterinary Services, the following scale of charges which will apply to all vaccinations carried out after the first of January, 1947, has been fixed. Herds with 14 calves or less 1/6d. per calf; herds with more than 14 calves 1/6d. per head for the first 14 calves and 1/3d. per head thereafter.

To simplify the procedure as far as possible it has been decided that dairy farmers may now make applications in their own districts. Members of Veterinary Clubs should apply to the secretary of their clubs; all others should apply to the nearest Inspectors of Stock. An exception to this procedure may be made in some districts where Club Veterinarians and Inspectors of Stock agree to divide the district into blocks to save travelling. In such cases farmers will be advised in the local press concerning the office to which applications should be sent. All applications to Inspectors of Stock must be accompanied by a cash payment calculated on the above basis. Veterinary Clubs will make their own arrangements for the collection of fees.

All applications must be sent in by December 31. This is most important. In the past much unnecessary travelling has been caused by late applications. Vaccinating officers have planned their itineraries to cover the district in the most efficient way possible. Then, after calves of all early applicants have been vaccinated, it has been necessary to cover the whole ground again, sometimes several times, for the sake of a few late applicants. Shortage of staff and transport make this most undesirable. Next year it may be impossible to vaccinate calves for which applications are not received before December 31 and they will in any case be done only at the convenience of the Vaccinating Officer after all other work has been completed. As most heifers kept are born before the end of October, there should be no excuse for late applications. So for their own sakes farmers should apply as soon as they know how many heifers they intend to keep.

Although the experimental stage is now passed as far as immunity during first and second pregnancies is concerned, it is important that accurate information should be obtained concerning the length of immunity. All farmers are therefore requested to fill in the full details concerning abortions, etc., which are asked for on the back of the application forms. **New forms provided this year may be obtained from Veterinary Clubs or Departmental offices. All applications must be made on the new forms.**

Farmers can materially assist the Vaccinating Officers in this work by providing reasonable facilities. Your Veterinarian or Inspector of Stock should be consulted concerning the best method of handling the calves, and he should not be expected to work in a muddy paddock or without any bails or races or any assistance in catching and holding the calves. Where possible, especially in small herds, arrange for calves belonging to several farmers to be brought together in one place.

Remember:

1. **New application forms are being used and these are now available at the office of your Veterinary Club or that of the Inspector of Stock.**
2. **Cash must accompany applications to Inspectors of Stock.**
3. **Fill in applications carefully and forward them early either to the secretary of your Veterinary Club or to the district Inspector of Stock. They must be in before December 31.**

J. F. FILMER, Director,
Animal Research Division, Wellington.

Answer to Correspondent

Death of Pedigree Bull

"J.T.C.," Waimana:—

ABOUT three weeks ago we noticed our pedigree bull was occasionally swollen in the stomach as if blown. He would be blown one day, then go down to normal again, until about a week ago he remained swollen and began to get larger and did not feed. We drenched him and gave him an enema of soap and water, with no beneficial effect. Eventually we had to destroy him. Examination disclosed all stomachs full. The third was fullest and the contents undigested, and a considerable quantity of sand was found in the stomachs; in one it was finger deep. After he was shot a quantity of dirty brown fluid poured out of his mouth. One side of the stomach lining was highly discoloured. Feed for the week before his death consisted of good grass and a little hay—about 20lb. a day.

LIVESTOCK DIVISION:—

From the symptoms it would appear that the animal had some obstruction of the oesophagus, and in these cases it is usually something pressing on the oesophagus in the chest cavity. One would expect that this pressure was due to an enlarged lymph gland (known as the mediastinal lymph gland) lying close to the oesophagus in the passage through the chest cavity. Such enlargement is usually due either to tuberculosis, malignant growth (popularly known as a cancer), or actinomycosis (which is due to the same organism that produces lumpy jaw).

If the chest had been examined in the post-morten, the cause of the trouble would have been found there.

The sand and food in the stomach are relatively unimportant evidence, as is the fluid which poured out of the rumen when the bull was shot. This is a common occurrence.

The stomach lining is usually discoloured due to blood in the vessels on the side on which the weight of the stomach content is pressing at the time of death.

If a case of this nature arises again, application should be made to the Department of Agriculture to have the animal tuberculin tested, as it is quite useless attempting to treat a case in which tuberculosis has caused the obstruction.

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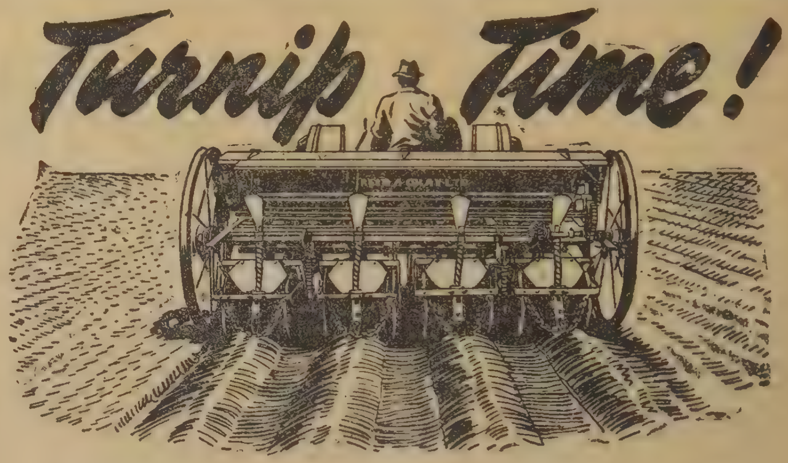
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THE LINSEED CROP

By E. G. SMITH, *Fields Instructor, Rangiora.*

THE world's chief producers of linseed are Russia, India, Argentina, Canada, and U.S.A. The area devoted to this crop in New Zealand has varied considerably from year to year, chiefly because of price fluctuations. However, with the present assured market at a payable price it is probable that the area sown in linseed will become more stable and that in many districts it will be looked upon as an important crop in the rotation.

THE Dominion's present linseed oil requirements are about 1,000,000 gallons a year, and a factory capable of producing this quantity has been established in Dunedin. As this factory will require the produce of some 30,000 acres annually, the demand is not likely to decrease to any marked extent.

Linseed is similar in appearance to linen flax, although the latter has been selected for straw with a high percentage of fibre, while linseed has been selected for the high oil content of the seed. Although the soil type and climatic conditions required are similar for each crop, linseed can be successfully grown where linen flax may fail through not attaining a sufficient length of straw.

The following table indicates the area sown in linseed in the past 10 years:—

	acres		acres
1936-37	501	1941-42	387
1937-38	607	1942-43	354
1938-39	1,716	1943-44	702
1939-40	1,164	1944-45	4,800
1940-41	1,194	1945-46	12,200

In the past linseed has been grown principally in North Canterbury, although it has also been grown in Mid- and South Canterbury.

The area sown for the 1945-46 harvest was distributed as follows:—

	acres
Otago and Southland	1500
South Canterbury	2500
Mid-Canterbury	2000
North Canterbury	6200

Soil Type and Climate

Linseed thrives in a semi-acid soil and has in the past been grown chiefly on medium clay loams. It can, however, be successfully grown on a wide range of soil types, although, as with most crops, the better the land the heavier the seed yield.

Calm, warm days with showers during the growing season do much to ensure good seed yields. Under these conditions the plants suffer no check and well-branched and even growth will result. Relatively dry conditions after the seed has developed give ideal ripening, while continued wet weather during this period may cause second growth with resultant harvesting difficulties.

Weed Factor

Under suitable soil and climatic conditions linseed plants make rapid growth but cannot compete with vigorous weed growth. As the crop is usually spring sown, it is important to select land that is reasonably free from weed seeds such as yarr or fathen, as an infestation of such weeds gives the crop little chance of success.

Spraying for weed control with various chemical preparations is under trial, and present indications are that if a linseed crop is sprayed when the plants are 3in. high, weeds can be killed with no deleterious effect on the crop. This treatment is still only in the experimental stage, but if it can be put into practice on a commercial scale, it will enable farmers on weed-infested land to grow profitable crops of linseed and at the same time assist in the preparation of land for the following crop.

Place in Rotation

Linseed is generally sown on land out of grass, although, if soil fertility is reasonably high, good yields can be produced after a grain crop. Sown

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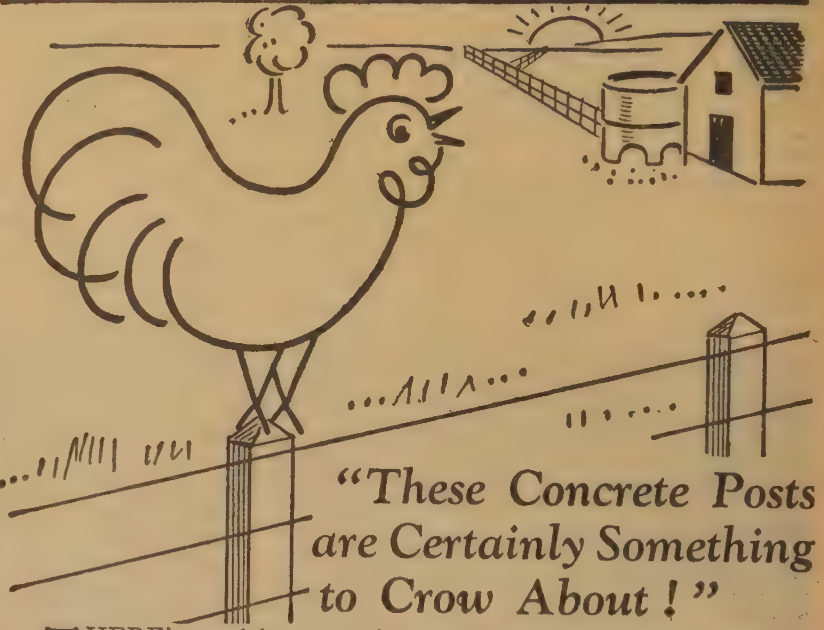

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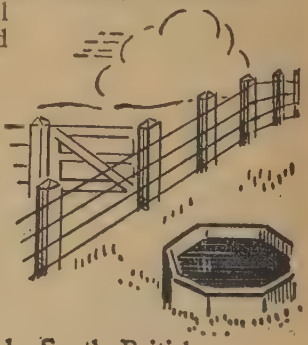

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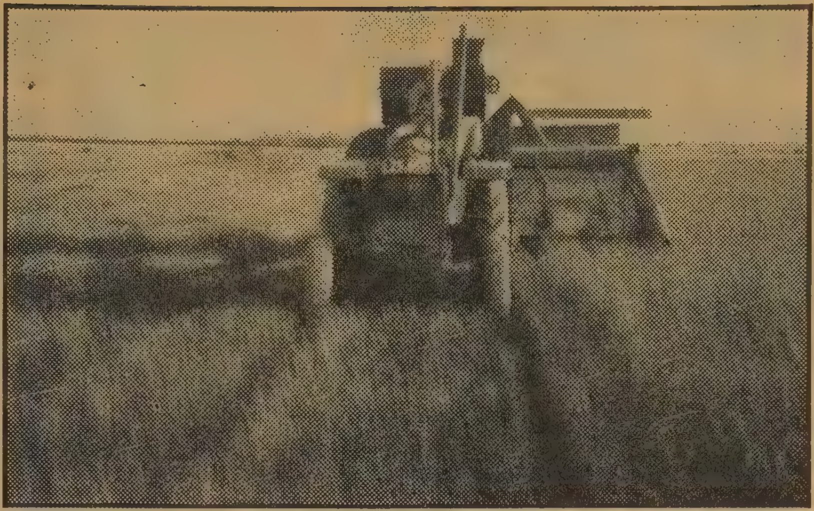

Direct heading of linseed.

after such crops as rape or turnips some excellent yields of linseed have been harvested.

Wheat is the most popular crop to follow linseed, although it has been found that when suitable cultural methods are practised practically any subsequent crop may be grown. While it is recognised that the safest method of establishment of pasture is to sow in early autumn after a summer fallow, some excellent pastures have been obtained by sowing the pasture mixture with linseed. The young pasture seldom has a detrimental effect on the harvesting of the crop, although in wet seasons excessive growth of red clover could prove troublesome, particularly in cases where the crop is reaped and tied. Working of land and sowing of grasses and clovers directly after harvesting a linseed crop is not generally recommended. However, if harvesting is completed in early autumn, satisfactory establishment of pasture may be obtained.

Cultural Methods

Small seeds require a firm and fine seed-bed, and in the past the popular method of preparing land for linseed was early winter ploughing of run-out pasture to a depth of 4 or 5in. followed by rolling on the furrow.

The land was then left in the furrow until early spring, when it was disced to a depth of about 3in. and later worked down to a fine tilth. This shallow working gave a very firm top-soil, but unless the land is worked to the bottom of the furrow, tunnels are left between the furrows and the soil loses moisture rapidly during a dry spell. If, on the other hand, skim ploughing or hustling is carried out in the autumn, followed by later cultivation and then deep ploughing in early spring, the soil becomes consolidated. After working with grubber, harrows, and roller a thoroughly firm seed-bed results.

It must be remembered that time and weathering of the soil will do more good than any amount of hasty cultivation. Although the seed should be sown on a rolled surface to obtain an even depth of sowing, the roller compacts only the surface soil, while weathering firms the soil to the depth of the furrow and thus ensures storage of moisture.

However, no hard-and-fast rules can be laid down for the working of the land and some excellent crops have been grown on one furrow.

Varieties

Bill Moose, Blue Riga, and New Zealand Commercial were the only linseed varieties widely grown in New Zealand before the war. The two first named have now lost favour, Bill Moose because of its short straw and Blue Riga because of its low oil content. New Zealand Commercial is still grown to some extent, although the variety most widely grown for the past two years is Bison.

Variety trials laid down and harvested by the Department of Agriculture indicate that three new varieties show promise of heavy yield coupled with rust resistance. On this year's experience Golden Viking proved to be the heaviest yielder and also the most rust resistant of the five varieties grown. Both Walsh and Rio yielded well and showed some resistance to rust. Rio is late to mature and therefore an early sowing is desirable. Yields of Bison and New Zealand Commercial were satisfactory, though it would appear that the latter is the variety most subject to rust infection.

These results, however, are not conclusive, and the trials will be continued in the coming season to obtain further knowledge of all varieties.

Sowing and Manuring

As with all crops the time of sowing is governed to some extent by climatic conditions, but in normal seasons in Canterbury October is the most suitable month in which to sow. If the seed is sown too early before the soil is reasonably warm, the slow establishment of the linseed plants favours weed growth. If, on the other hand, a late sowing is made, the crop may experience dry weather at a critical stage of its growth. On good land late-sown crops have in some cases given good yields; this, however, is the exception rather than the rule.

The correct rate of seeding varies from 35 to 65lb. an acre according to the size of the different varieties.

Sowing on a rolled surface through every coulter of the grain drill is the method most widely practised. As the seed should be sown at a depth of not more than 1in., coulters should be set right back and where possible well-worn coulter points should be used. This method has the advantage of concentrating the fertiliser with the seed as well as giving an even depth of sowing.

Cross drilling has proved quite satisfactory, although in the writer's opinion the extra work and risk entailed are not warranted. There are two main disadvantages of cross drilling. First, it is not always possible to ensure that both sowings are at an even depth to ensure an even strike. The importance of an even depth of sowing cannot be over-emphasised, as uniform establishment and growth are of vital importance. If seed is buried too deeply, the seedling is weakened to such an extent that yields must be reduced. Second, if wet weather intervenes between the two drillings, it is sometimes impracticable to complete the work. If, however, the farmer decides to cross drill, he will be well advised to roll between the two operations to assure that the first drilling is not buried too deeply.

Light harrows should always follow the drill, for if rain is experienced just after drilling is completed, the fine soil is washed into the coulter marks and the crust so formed is detrimental to rapid and even establishment. Rolling after drilling is not recommended.

With ideal soil and climatic conditions broadcasting the seed on a rolled surface followed by a light harrowing is satisfactory, but even though the seed-bed may be in perfect condition for the quick germination of the seed, a few days' north-west winds dry the top-soil to such an extent that the establishment of the young plants is seriously affected. Drilling one way

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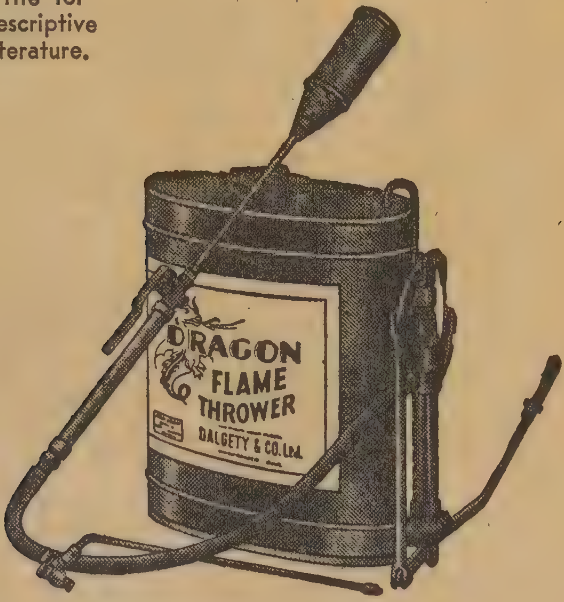

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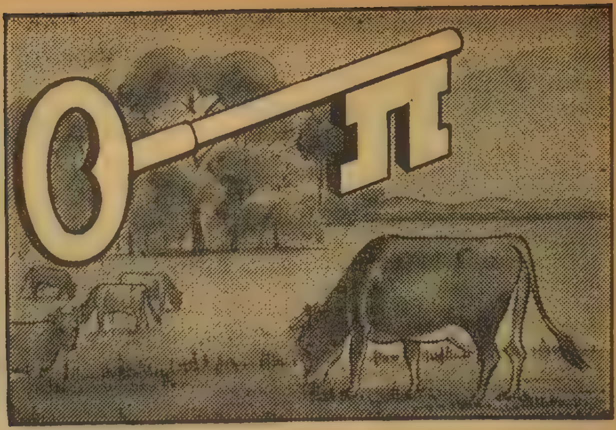

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Well-built linseed stacks awaiting threshing.

through every coulter of the grain drill is therefore the most satisfactory method of sowing.

As linseed thrives on semi-acid soils, the application of lime just before sowing is not recommended; in fact, growth has sometimes been depressed through the adoption of this practice. If, however, lime has been applied to the pasture before the area is ploughed for linseed, no ill effects have resulted. Many of the best crops have been sown after pasture that has received heavy application of lime.

Quick establishment with resultant improved yield is encouraged by the application of 1cwt. of either superphosphate or serpentine superphosphate an acre drilled with the seed.

Treatment after Sowing

Under normal conditions harrowing of linseed is not recommended. If, however, heavy rain has caked the topsoil before the young plants have established, a light tine harrow with well-sharpened points may be used. Harrowing should be carried out when the crop is 3 to 4in. high and should follow the same direction as the drills, thus breaking the crusted surface soil with the minimum of damage to the crop. In this way reasonable yields have sometimes been obtained where otherwise a crop failure would have been inevitable.

Harvesting and Yield

The crop is usually harvested in late February or in March. Reaping with the binder and threshing out of either stook or stack is probably the most reliable method of harvesting, as linseed conditions well in stook and can be stacked before it is fit to thresh. If this method of harvesting is adopted, ledger plates and knives should be in good condition and the short knife section is preferable to the standard one

However, under present labour conditions the header is usually employed. The crop can be either windrowed with the binder or mower and later picked up by the header, or, should ripening be sufficiently even, it may be direct headed. Light crops have occasionally been harvested with a chain drum stripper, but the header harvester is the more satisfactory machine.

Yields vary considerably, 8cwt. an acre being a fair average, although under better methods of cultivation as the result of better understanding of the requirements of the crop this figure could be increased. Numerous crops grown last season yielded better than 15cwt. an acre and a few in the vicinity of 1 ton an acre.

Diseases

Rust causes the most serious loss in the linseed crop. This disease may be carried over the winter on either self-sown or wild linseed and the spores wind borne during the summer months. The infection starts on the leaves, but under humid conditions spreads rapidly to the stem, and a severe infection will substantially reduce the yield. The only reliable method of control is the sowing of rust-resistant varieties.

Browning and wilt may cause dying off either in the seedling or the more mature stages of growth, but as soil temperatures in the linseed-growing districts are seldom high enough to favour their spread, these diseases have not generally proved troublesome. Both browning and wilt may be soil borne, and if either has been noted in a crop, the area should not be resown to linseed for at least five years.

A hot water seed treatment and the dusting of the seed with a dry mercurial dust have given some control, but it is advisable to sow disease-resistant varieties harvested from clean crops.

Summary

1. Under present conditions linseed is likely to become a more stable crop.
2. This crop can be grown on a wide range of soil types throughout the South Island.
3. Early ploughing gives consolidation of the soil and assists in the conservation of soil moisture.
4. The crop should be sown as soon as the soil is warm enough to give quick germination and establishment.
5. Sowing through every coulter of the grain drill is the method most commonly favoured.
6. The crop may be cut with the binder and threshed from the stook or stack, or, under favourable conditions, may be either windrowed or direct headed.

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V.T.A.

PEDIGREE SOW RECORDS

Contributed by the Livestock Division.

DURING the three months July—September, 1946, 19 of the 22 litters recorded were sufficiently good to be included in one of the five grades set out below.

Grade	Minimum Litter Weight.	
	At 3 weeks.	At 8 weeks.
1	120 lb.	360 lb.
2	100 „	300 „
3	90 „	270 „
4	80 „	240 „
5	70 „	210 „

Breed Averages for the Period Under Review

Breed.	No. of Litters Recorded	Litter Weight at		Number of Pigs.		Average Weight at	
		3 weeks. (lb.)	8 weeks. (lb.)	Born.	Weaned.	3 weeks. (lb.)	8 weeks. (lb.)
Berkshire ..	13	103.8	297.1	10.3	8.6	12.04	34.48
Large White .	6	105.8	318.8	10.7	8.5	12.45	37.51
Large Black .	2	109.0	291.5	8.5	7.5	14.53	38.89

A No. 3 grade litter is looked on as a good performance, No. 2 as excellent, and No. 1 as special.

THE following list gives the names and addresses of the breeders of recorded sows and details of the litters:

Owner's Name and Address.	Herd Book No. of—		Litter Weight at		No. of Pigs.		Grade of Litter
	Sire.	Dam.	3 weeks. (lb.)	8 weeks. (lb.)	Born	Weaned	
Berkshire							
Hodgkinson, H. E., Rotomanu, Westland	18295	18278	78	242	11	7	5
Hodgkinson, H. E., Rotomanu, Westland	18295	20718	103	265	8	8	4
Larsen, O. C., R.D. Aorangi, Feilding	18903	21106	138	368	10	10	1
Larsen, O. C., R.D. Aorangi, Feilding	18903	20572	131	407	11	11	1
Larsen, O. C., R.D. Aorangi, Feilding	21107	20566	84	216	11	7	5
Larsen, O. C., R.D. Aorangi, Feilding	21107	21264	94	265	9	8	4
Larsen, O. C., R.D. Aorangi, Feilding	18903	20570	87	284	7	7	4
Larsen, O. C., R.D. Aorangi, Feilding	19492	19370	117	249	10	7	4
O'Sullivan, A. M., Box 28, Midhirst, Taranaki ..	20908	19576	162	393	13	12	1
Burmeister, O. P., Kairanga R.D., Palmerston North	20113	18876	74	261	11	8	5
Rotomanu Pig Club (Secretary, H. E. Hodgkinson, Rotomanu)	18295	19461	73	174	10	6	—
Rowlands, T. E., Ruthin R.D., Kaiapoi	6113*	19301	75	294	10	8	5
Major, C. A., Turakina	14085	20254	133	444	13	13	1
Tamworth							
Ogle, F., and Son, Normanby	14707	13817	161	333	14	11	2
Large White							
Twyman, W. A. H., Ngakuru R.D., Rotorua ..	6304	6067	143	490	9	9	1
Twyman, W. A. H., Ngakuru R.D., Rotorua ..	6593	6045	134	416	15	13	1
Haydon, G. C., Barrytown, Greymouth	5671	6354	132	370	11	11	1
Rowlands, T. E., Ruthin R.M.D., Kaiapoi	21227†	6645	65	213	6	5	—
Rowlands, T. E., Ruthin R.M.D., Kaiapoi	21227†	6647	86	268	11	8	4
Rowlands, T. E., Ruthin R.M.D., Kaiapoi	6113	5855	75	156	12	5	—
Large Black							
Whitelock, G. M., Kairanga R.D., Palmerston North	3583	3595	106	343	9	7	2
Irving, R., Ruawaro R.D., Huntly	4885	4448	112	240	8	8	4

* Large White.

† Berkshire.

Preparation of Lea Land for Wheat

HURRIED, last-minute tractor cultivation tends to operate adversely on two important factors of successful wheat growing. Wheat will usually do better on land that has been ploughed for some time than on a freshly-turned furrow, and the tendency to depend on the tractor for a last-minute rush of ploughing should be avoided. Wheat also thrives best on a firm bottom, but hurried, last-minute cultivation at high speed renders it difficult to secure the necessary firmness underneath. Time and weather on the furrow are still important factors in successful cropping.

The treatment of grassland in preparation for sowing wheat will vary according to the type of pasture. A short-term lea of ryegrass and clover reasonably free from weeds should require only one deep ploughing towards the end of the summer. The pasture should be grazed as bare as possible and a skim coulter used to bury all surface growth in the bottom of the furrow. Rolling on the furrow is most essential to ensure a firm bottom, and subsequent cultivation should be designed to secure consolidation without too fine a surface. A somewhat coarse, loose surface, solid underneath, provides the best seed-bed.

A good deal more preparatory work is necessary with an old pasture with weeds of a twitchy nature. Skim ploughing to a depth of 2in. should be carried out in the late spring or early summer, and the sod well worked when dry with the cultivator and harrows to a state of disintegration. Twitch can then be harrowed up and burnt in heaps. Deep ploughing should follow early in the autumn, to a depth of 8in. if this can be done without bringing subsoil to the surface. Rolling to achieve firmness for the full depth of the furrow and light surface cultivation to destroy weeds germinating with the autumn rains will secure a good seed-bed for sowing in May.

A. D. MERCER,
Fields Instructor, Auckland.

CULTURE OF THE FEIJOA

INCREASING interest is being shown in the several so-called "sub-tropical" fruits which are grown in the more favourable parts of New Zealand. The demand for feijoas has far exceeded the supply in recent years, and is likely to be even keener when the fruit is offered for sale in prime condition and the housewife becomes more familiar with its uses. In this article F. Sydenham deals with the growing of feijoas.

THE feijoa (*Feijoa sellowiana* Berg.) belongs to the family *Myrtaceae*, and is a native of South America, where it grows on open country as a small evergreen tree. The climate of its natural home is rigorous, having low temperatures in winter and high in summer with occasional long periods of drought.

The fruit is valued by the native people, and its quality was so appreciated by an explorer that he introduced it to Southern Europe late in the last century. From there it has been introduced to North America and to other parts of the world. In New Zealand the feijoa came into prominence about 1930, when it was offered by nurserymen as an ornamental evergreen tree. It was described as growing to about 15ft. high, with showy red and white blossoms, attractive green foliage with a silvery undersurface, and bearing a useful fruit. It was not long before the fruit began to gain favour because of its fine qualities and delicate flavour.

While most of the specimens in New Zealand are less than 15 years old, there is one planting that was made in the Bay of Plenty about 40 years ago. During the past 30 years it has not been cultivated or manured, yet these old trees continue to bear regular and heavy crops of a good type of fruit. This shows that the feijoa is not short-lived, and will continue to bear for many years without special attention.

The fruit is oval in shape, green while on the tree, but becoming yellowish-green, often with bronze markings, when ripe. The skin is smooth and thin, and the flesh is solid, granular and juicy in texture, and whitish in colour. The fruit ripens after falling, and then has a distinctive sub-acid flavour and a characteristic aroma, which make it an attractive and valuable addition to the fruit supply, especially as it matures in May and June when the range of fresh fruits is becoming limited.

Many Uses

Feijoas may be put to many uses. The seeds are so small that they are not objectionable, and the whole fruit may be peeled and eaten raw, or cut into slices, sweetened slightly, and used in fresh fruit salad. When stewed it develops a rich flavour reminiscent of pineapple and has sometimes been called "pineapple guava." It can also be used in fruit tarts, bottled, or made into jams and jellies.

While private gardeners who know how to use feijoas have appreciated the fruit grown in their own gardens, the purchasing public have not always been offered it in the best condition. Much of the fruit offered for sale has been fresh from the tree, hard, unripe, and with an undeveloped flavour. It may be advisable to market the fruit while still firm, but it should not be eaten until it is really ripe—that is, when it is yellowish-green in colour, slightly soft to the touch, and has a distinct aroma.

Climate

Although the feijoa has usually been referred to as a sub-tropical fruit, it is capable of withstanding a considerable degree of frost. There is no evidence to indicate how much frost it will stand in New Zealand without injury; but it is recorded that a tree in France was uninjured at a temperature of 12 deg. F. (which is the equivalent of 20 deg. of frost), and the plant is known to have withstood 28 deg. of frost in South America. The tree resists winds remarkably well, and might even serve in fruit-growing districts as a useful windbreak of a height up to 15ft. A warm aspect is desirable but not necessary, and situation seems to be relatively unimportant.

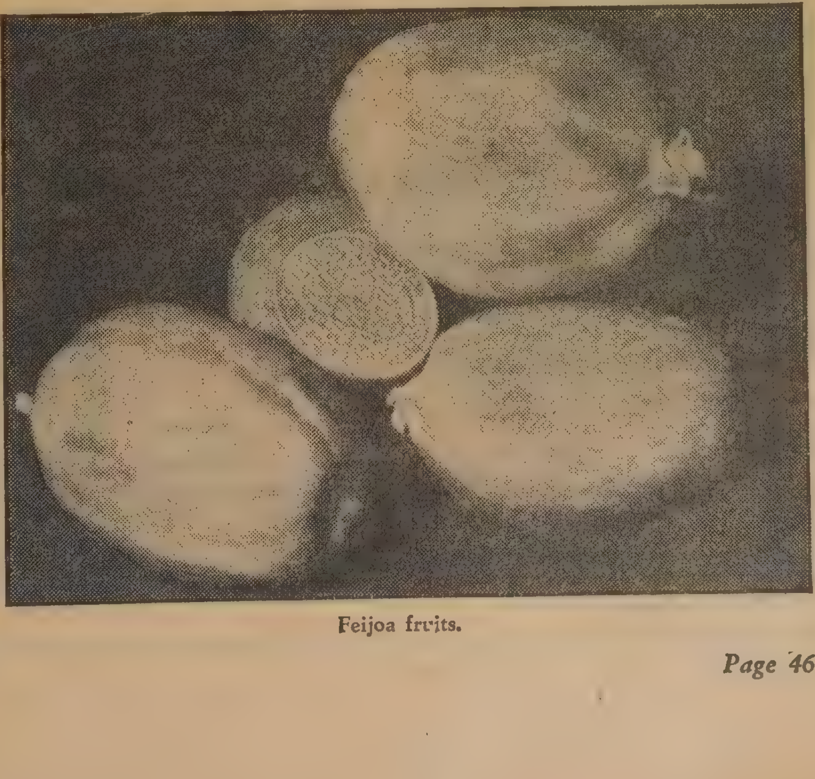
Soil

Providing the drainage is satisfactory, the feijoa grows well on light, sandy soils, but produces smaller fruit than when grown on more fertile, loamy soils.

Varieties

Most of the feijoas in New Zealand have been raised from seed, and from the variations which have occurred here and in other countries desirable forms have been selected. Some of these have been named as varieties, but there is as yet little evidence regarding their respective characteristics and cropping capacities. Nursery firms have offered the varieties "Magnifica," "Coolidgeii," "Superba," and "Choiceana," and also small-fruited and large-fruited seedlings.

The ideal feijoa tree is one that regularly bears heavy crops of uniformly-large fruit with a smooth skin and a good flavour. Most of the crop should not be less than 3½in. long and not less than 2in. in diameter.



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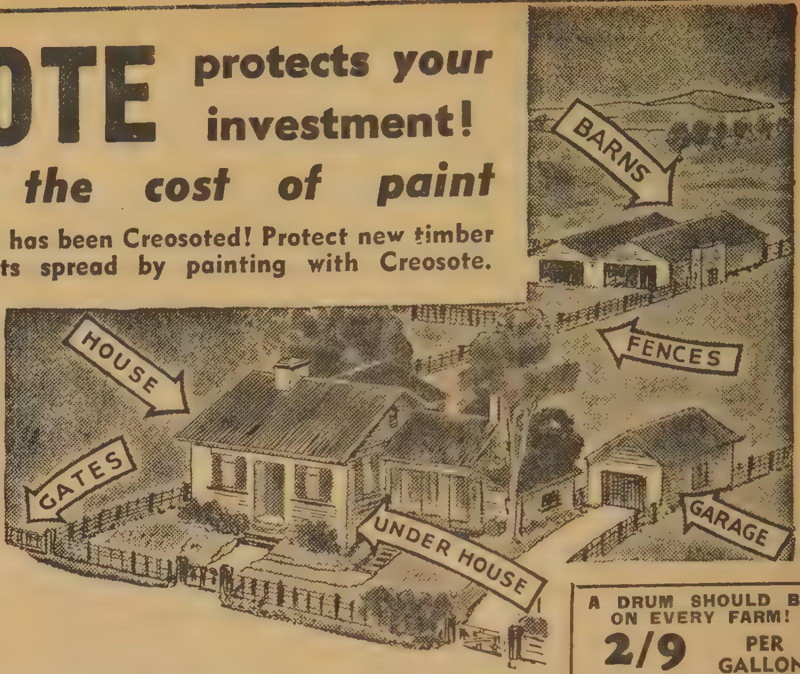

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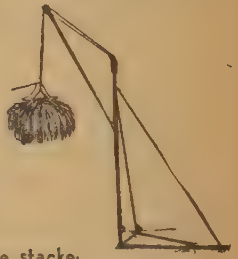

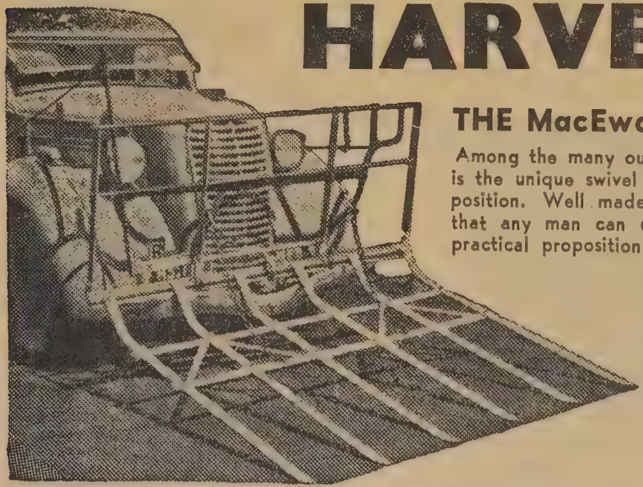

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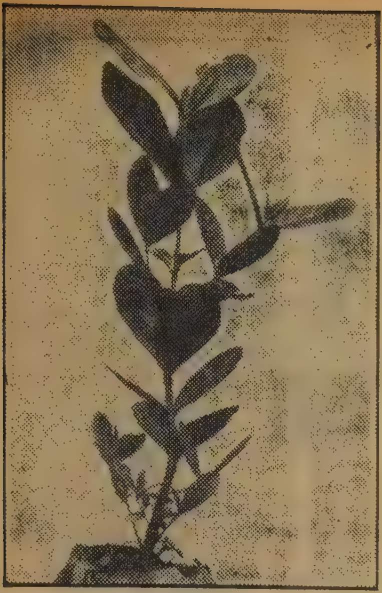

Fig. 1—A one-year-old feijoa seedling.

There is a considerable variation in the pollination requirements of different plants. Some are said to be self-sterile and others self-fertile. Until plants known to be self-fertile can be obtained it is advisable to plant several specimens together to be certain of adequate pollination. It has been stated that the variety "Coolidgeii" is self-fertile, since isolated trees are known to have borne regularly.

Propagation

Propagation by raising from seed is not the accepted practice overseas. Plants known to be true to parental type are obtained by layering, by cuttings, or by grafting on to seedling stocks.

Layers are best made in the autumn, when convenient branches are lowered into scooped-out depressions in the soil, pegged down, and covered for a length of about 6in. with 3 to 4in. of soil. Root development depends largely on the moisture supply, and providing this is satisfactory, it should be possible to remove the rooted layer from the parent tree the following autumn. It should then be grown in a nursery-bed for another year to produce a plant with a strong rooting system for planting out.

Young wood taken from the tips of the branches in January or February is used for propagating by cuttings. This is trimmed to a length of about 4in., the final cut being made immediately below a bud on the stem. Two leaves only should be retained, the remainder being cut off. The cuttings are then set firmly in a mixture of coarse sand and rotted fibrous material, with only their tips showing above the surface. With bottom heat and high humidity, cuttings root in 4 to 8 weeks. If propagating equipment is not available, they may be inserted into a similar medium in a box and covered with a pane of glass. The roots develop slowly without bottom heat, but if the sandy mixture is kept moist, the "strike" should be satisfactory.

For grafting, the stocks, which are normally seedlings, should be about the diameter of a lead pencil, and the scions should be taken from firm wood of slightly less diameter and about 4in. long. Whip-grafting is the method usually employed overseas, but this method of propagation has not been practised in New Zealand.

Seedlings

Nurserymen in New Zealand, almost exclusively, offer seedlings. These are generally grown from seed of specially-selected trees, and in many instances produce progeny which are similar to the parent tree. Seed is taken from ripe fruit in May and set in a gritty-soil mixture. Only a light covering of soil is required, and to ensure good germination the surface soil of the seed-box should not be allowed to dry out. Sown in May, the seedlings should be ½in. high by September and large enough to transfer to more suitable containers. They may then be put singly into 3in. pots or spaced at 4in. intervals in seed-boxes. In twelve months they should have developed into plants 8 to 12in. high (as shown in Fig. 1), at which stage they are quite suitable for planting into their permanent positions, although they may be set out into nursery rows and grown for another year if larger plants are required.

The feijoa can be transplanted without difficulty, and, if wrenched 3 or 4 weeks before lifting, a ball of fibrous roots and soil can be taken with the plant.

Planting

Planting distances will vary according to the use to which the tree is put. As a specimen in a private garden each tree should be allowed a circle of 10 to 12ft. diameter. When grown as a one-row hedge for shelter purposes, trees may be planted as close as 5 to 6ft. It is difficult to recommend systems for spacing feijoas in plantations, as there are no mature plantings of this nature in New Zealand, but if placed 12ft. apart each way, the mature trees should stand as individuals. This spacing requires 302 trees to the acre. The same number would be required if the spacing in the row were 8ft. and the distance between the rows 18ft. In this layout the trees in the row would grow into one another and form a continuous row, with adequate space between the rows to handle the crop. On very fertile land it may be preferable to space them 15ft. apart each way.

The most suitable time to plant feijoas varies with the district and the soil. Where possible, planting should be done in late autumn or early winter to allow for root development and establishment before growth commences in the spring. The trees establish quite satisfactorily from winter and early-spring planting, but they do not make such early growth as from late-autumn and early-winter planting.

Attention After Planting

Weeds should be kept down by cultivation, and as the spring develops the plants will benefit from a mulch of green grass, hay, or similar material, especially when grown on light soil. A mulch shades the soil, keeps the surface cool and moist, and adds to the humus supply of the soil.

While a plantation is becoming established, the space between the rows may be used for inter-cropping. **The choice of crops for this purpose is most important. No crop which will overshadow and thus check the development of the young feijoa plant should be used.** Maize, although tall-

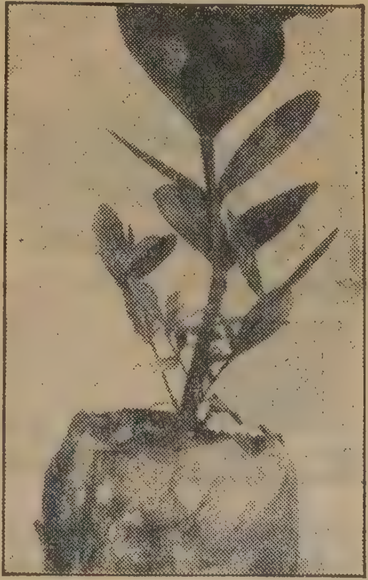

Fig. 2—Numerous small shoots rise from the base of young plants. These should be removed as they appear if a tree with a main trunk is required.

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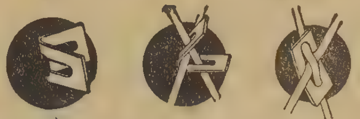

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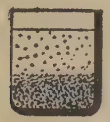
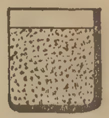


Ordinary mixture five minutes after mixing.



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growing, would be useful in providing a valuable temporary shelter with a minimum of shading.

As the trees develop the use of the ground between the rows should be decreased until finally no inter-cropping is done. Green manuring crops should then be sown annually. They should not be cultivated into the soil until they have made optimum growth, and every care should be taken not to injure the tree's fibrous rooting system, which grows close to the surface of the soil. It is not advisable to sow cover crops near the feijoas in the first year after planting, because of the likelihood of their shading the trees.

Pruning

Removal of basal growths is especially important in the nursery and in the early years of the plantation to ensure shapely trees. Fig. 2 shows the base of a one-year-old seedling with numerous small shoots rising from near soil level. These should be rubbed off as they appear, or cut out subsequently to produce a tree with a main trunk (see Fig. 3) instead of one branching from ground level (see Fig. 4). The type of tree as illustrated in Fig. 3 facilitates cultivation and picking operations.

In subsequent years little pruning will probably be required beyond possible thinning and cutting back for the purpose of producing fewer and larger fruit.

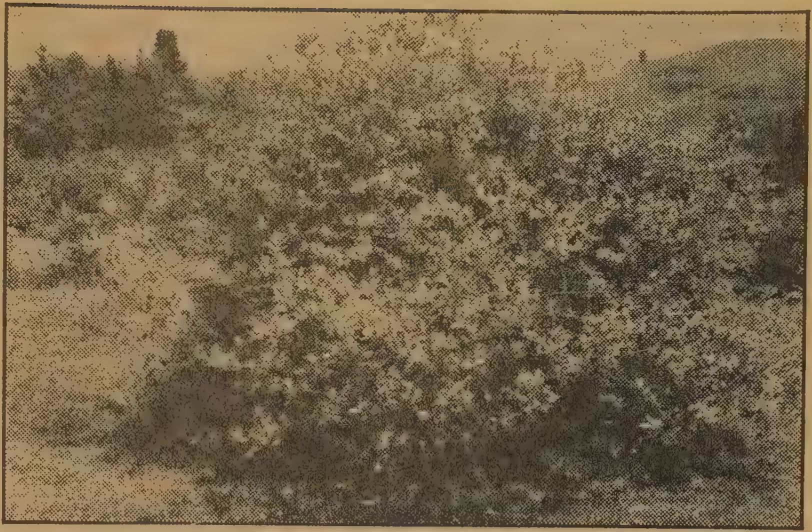


Fig. 4—Unregulated feijoas grow into bushes with numerous branches rising from ground level.

Manuring

Every assistance should be given to the young plant to ensure the maximum development of root and top in the first few years. A handful of blood and bone (or of a mixture of superphosphate and sulphate of ammonia in the proportion of 3:1 respectively) may be mixed with the soil under each tree at planting time. In subsequent years the annual dressing may be increased until the trees are receiving 8 to 10oz. each when they commence to bear. The manure should be applied early in the spring over a circle of ground under the tree equivalent to the spread of the branches.

When the trees are in heavy bearing the grower is recommended to be cautious in the use of fertilisers. Although no manurial trials have been carried out in New Zealand, cases have been observed where growth was stimulated at the expense of fruit production, especially when the dressing used was too rich in nitrogen.

When maturity is reached and the trees appear to be losing vigour and the fruit shows signs of becoming smaller, 2 to 4lb. of the superphosphate and sulphate of ammonia mixture applied to each tree in the early spring will improve their condition. As the rooting system is shallow, fertilisers spread over the ground and lightly worked in should quickly become available to the tree.

Production

When planted as a two-year-old seedling, under good conditions a feijoa should commence to bear about 4 years later. If it is grown on fertile soil, a yield of up to 20lb. of fruit may be expected in the sixth year after planting. Matured trees have been known to produce 100lb. of fruit each, regularly from season to season.

Layered or grafted plants are claimed to bear one or two years earlier than seedlings, but bearing

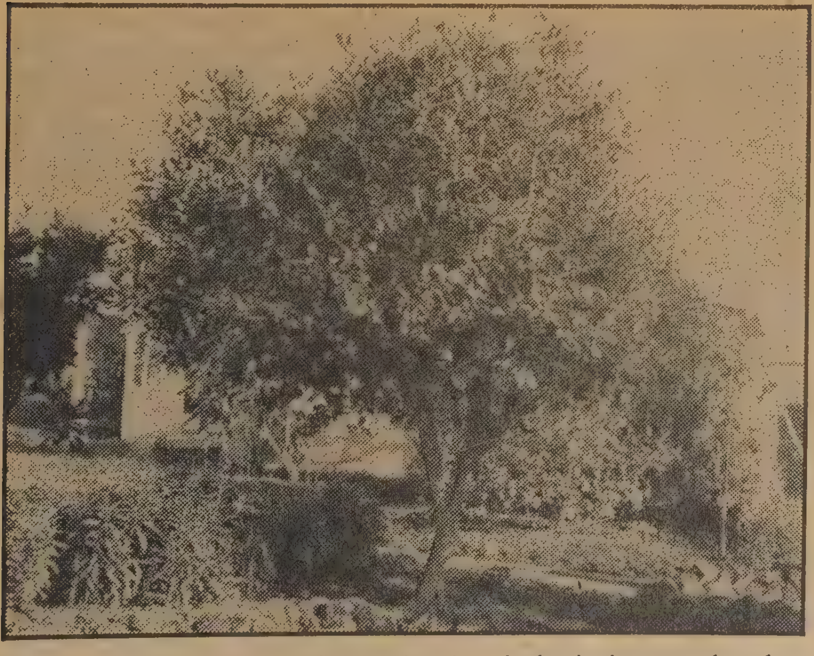


Fig. 3—Trees with a main trunk are preferable to bushes having many branches rising from ground level.

should be allowed only if they have made sufficient growth to carry a crop.

Harvesting

Since the feijoa is approximately the same size, shape, and colour as the leaves among which it is formed, it is very difficult to locate and pick. However, as the fruit attains full size and "tree-ripeness" at the end of April and during May it falls to the ground naturally, and from there should be collected daily. Falling fruit is surprisingly little bruised, but to minimise risk of damage it would be advisable after mid-April to maintain a loose-surface mulch under the trees.

At the stage when the fruit falls from the tree it is green and firm, and the flesh lacks flavour. It is not suitable for use until the colour changes to a yellowish-green, sometimes with bronze markings, and the flesh softens slightly. This takes place 2 to 3 weeks after falling. If feijoas had been offered to the public at this recommended stage of ripeness in the past, the fruit today would be much more popular and sought-after than it is.

If stored in a cool place, feijoas mature slowly, and may be kept in sound condition for a month or longer.

Diseases and Pests

No fungous diseases are recorded as infecting the feijoa. Troubles due to "damping-off" may be experienced in the seedling beds if the seed is set too thickly or the plants are allowed to grow to too large a size before being planted out.

Various soft-bodied scales may be found on feijoa trees, but can be controlled by spraying "summer oil" (1 part oil in 80 of water) on the trees in January and February when the young scales are on the move.

Birds may appear to damage the flowers, especially those of the variety "Coolidgeii," which has sweet fleshy petals. Although the petals are often removed, the fruiting structures are seldom damaged and fruit develops normally. In the natural habitat the succulence of the flowers is said to attract small birds, which serve to effect pollination.

Sacks Must be Saved

SHORTAGE SEEMS CERTAIN

UNLESS the greatest care is exercised to conserve and preserve sacks, woolpacks, and other jute products, there is a danger of the Dominion's industries—both primary and secondary—facing a serious shortage of these containers in 1947. As many industries depend directly on the use of sacks for the marketing of their goods, such a shortage must adversely affect production.

THOUGH supplies of new sacks were naturally not as plentiful during the war as in normal times, present indications are that the world shortage of jute will become more acute next year. The primary cause is that to avert starvation among her population India, the only country that produces jute for export, has been compelled for the past two years to plant in rice areas normally used for jute cultivation. A lowered output from the mills has also been caused by reduced hours of work, strikes, riots, and general labour unrest throughout the country, and many mills have had to close down temporarily because of lack of coal. Furthermore, the 1946 jute crop has yielded only 5,500,000 bales compared with 8,000,000 bales in 1945, and, with liberated countries needing large quantities, world demand has increased considerably.

Shortage Appears Certain

The Indian Government has allotted an annual quota of jute to all countries requiring it. With the increase in production in New Zealand expected for 1947 in industries using sacks, woolpacks, hessian, canvas, jute yarn, and raw jute, the quota allocated to the Dominion appears certain to be short of the estimated requirements. Whether the shortage is slight or serious will depend on the attention given by producers to the care of sacks already in use.

The extent to which New Zealand's industries, and the primary industries in particular, rely on jute containers is possibly not generally realised. Estimates of the quantities required for 1947 include: 1,000,000 woolpacks, 4,000,000 grain and seed sacks, 8,000,000 fertiliser bags, 7,000,000 lime bags, and 4,000,000 cement bags. Additional supplies are needed for bagging flour, bran, pollard, potatoes, onions, oysters, maize, poultry mashes, meat meals, freezing works' products, vegetables, sugar, and many other products.

Enormous Wastage

Wastage of sacks and bags in New Zealand has been enormous in the past. Each year thousands are destroyed by careless handling and neglect. Most of these, if given considerate treatment, would remain serviceable for a long time. It is obvious that, if wastage is reduced and as many sacks as possible are kept in service, the quantities of new sacks required will be considerably lower.

As one of the chief causes of deterioration of sacks is dampness, all goods received in sacks should be stored in a dry place. When a sack is being opened with a knife care should be taken to avoid cutting the sacking. After the sack has been emptied it should be shaken thoroughly. Empty sacks that are dry should be stored in heaps.

The farmer should not wait for a large quantity of sacks to accumulate, but should consign his surplus sacks to dealers at regular intervals. In addition to being kept out of service, sacks lying in sheds are subject to damage by rats, mice, and other pests.

Ways of Meeting Shortage

All farmers and other users of sacks and bags are asked to help meet the expected shortage by:

1. Saving every one worth repairing.
2. Consigning or delivering their sacks to the nearest or usual depot. Dealers are prepared to pay fair prices for sound sacks, but it is useless sending them wet, rotting sacks, or those badly damaged by the acid in straight superphosphate. The name and address of the sender should be attached to bundles consigned by rail.
3. Conserving sacks by storing them in a dry place, and emptying superphosphate bags as soon as possible.
4. Making all sacks last as long as possible by careful handling.
5. Checking up on all likely places on the farm where sacks may have been stored or dumped and clearing all repairable ones to dealers. This will add to the number available at present and will prevent waste.

By giving their closest attention to this appeal, farmers will not only benefit financially from returning sound sacks, but will be performing a service to the whole industry.

HEATING GLASSHOUSES

Comparative Costs of Oil, Coal, and Electricity

By A. A. POWELL, *Cool Storage Officer, Wellington.*

INQUIRIES about the use of electric power for glasshouse heating have been received from growers recently. Though the initial outlay for installing electric heating equipment is comparatively low, the high running cost makes its use at present uneconomical compared with other types of heating.

GLASSHOUSES can be heated electrically either by heating water with an electric element and circulating it in the usual way, or by installing finned units to heat the air and a properly-designed system of distribution to ensure circulation of the heated air to all parts of the glasshouse. The second method should be more efficient, as all the heat produced is evenly distributed through the atmosphere of the glasshouse.

The greatest drawbacks to the use of electricity for this purpose at present are the shortage of power and the high cost of current compared with coal and fuel oil. The following comparisons show the amount of heat, calculated in British Thermal Units (B.T.U.), which can be bought for a penny when using electric power, fuel oil, or good-quality coal:—

Electricity

One unit of electricity (1 kilowatt hour) employing a heater of 100 per cent. efficiency produces 3,412 units of heat.

Cost of Current a Unit.	B.T.U. for One Penny.
1d.	3,412
¾d.	4,549
½d.	6,824
⅜d.	9,099
¼d.	13,648

If power can be obtained at ¼d. a unit, it would probably pay to design a system using finned heating tubes or elements and forced air distribution to control the temperature of the air in a glasshouse automatically under the varying conditions which arise from inside and outside influences. The finned heating tubes are obtainable in 1ft. 6in. lengths, using 500 watts each. A fan is necessary to force the air over these heaters to prevent them from overheating.

Coal

The estimated heat in 1lb. of best quality New Zealand non-coking coal is 10,000 B.T.U., and the average efficiency of a coal-fired tubular boiler is 65 per cent. Using coal at £2 15s. a ton to heat a glasshouse with a normal hot-water system, one penny would buy 22,060 B.T.U.

Oil Fuel

The estimated heat contained in 1lb. of fuel oil is 19,000 B.T.U., and the average efficiency of a tubular oil-fired boiler is 65 per cent. Using fuel oil at its present cost of £9 15s. 6d. a ton to heat a glasshouse using the normal hot-water system, one penny buys 11,792 B.T.U.

It has been suggested that an oil-fired heater of the type that heats the air direct, and not with hot water, could be used in a glasshouse. If it were efficiently installed within the glasshouse the thermal efficiency should be up to 95 per cent. instead of 65 per cent. with an oil-fired tubular hot-water boiler outside the house. The only heat loss would be from the flue above the roof, and that could be reduced to a minimum. Then one penny would buy 17,234 B.T.U.

If fuel oil were reduced in price to say £6 13s. a ton, 25,000 B.T.U. would be bought for a penny, which would mean that oil would give the same heating value as coal.

The greatest difficulty in applying a direct heat exchanger fired with either fuel oil or coal to the heating of a glasshouse is the temperature difference of about 800 degrees F. between the furnace heating tubes and the atmosphere of the glasshouse.

Conclusions

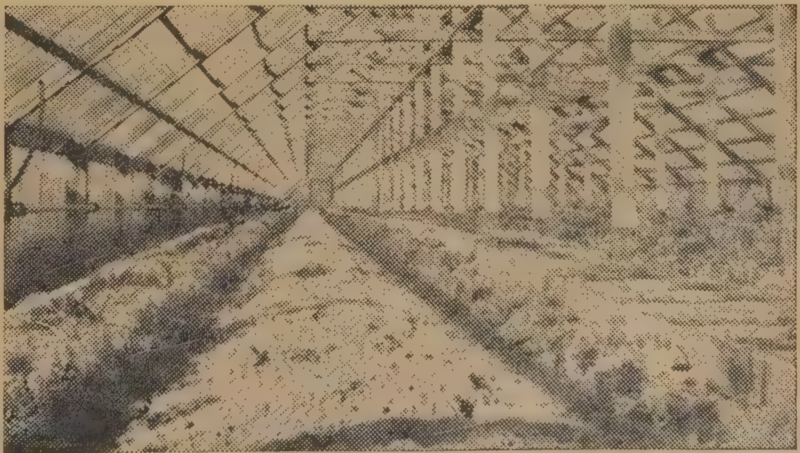
Electric Power: If power is available at reasonable cost, electric appliances may be ideal for heating the amateur's glasshouse, where cost of running is not a primary consideration and time and labour saving are of great importance. Though electric power is not at present economical for commercial glasshouse heating, there may be a strong case in some localities for making a partial use of electricity during peak periods as an auxiliary to the main heating.

It has been stated that to maintain a temperature of approximately 20 degrees F. above outside temperatures the loading of electric tubular heaters should be as follows:—

Size of Glasshouse (cubic feet)	Load (kilowatts)
250	1 to 1½
500	2
1,000	3
2,000	4

Coal: The use of good-quality coal in a tubular boiler for the circulation of hot water is by far the most economical method of heating a glasshouse at present.

Fuel Oil: Though fuel oil appears at first to be much more expensive than coal, other factors should be taken into account. Labour costs and wastage are less than for coal, and oil is much more easily adapted to use in a thermostatically-operated boiler. Oil, however, still seems to be considerably more expensive than coal.



[*Photo News Ltd.*

A heated glasshouse showing pipes carrying hot water in the mound of earth on the left.

"Seek, and ye shall find . . ."

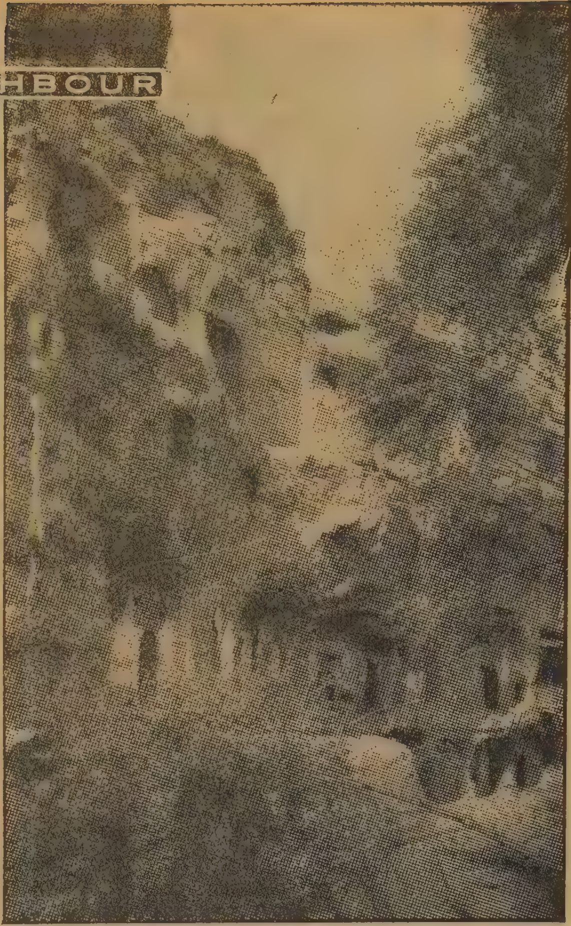
"Very full of dreams that desert, . . ."

FOR some time past a familiar feature of booksellers' displays has been a large blue-bound volume jacketed with a coloured reproduction of the fortress gateway marking the western end of the Great Wall which divides China from Mongolia, and bearing the inscription "The Gobi Desert." First published in 1942, and now in its eighth edition, this unique work won for its authors the Lawrence of Arabia Memorial Medal (the award of the Royal Central Asian Society) and also the Royal Scottish Geographical Society's Livingstone Medal. The copy before me as I write has on its title page the signatures of Mildred Cable and Francesca French, who compiled this remarkable record of 15 years' sojourn in the vast desert of Gobi. For together with Eva French, the other member of their party, the Trio, as they are popularly called, recently visited New Zealand on a lecture tour in connection with the centennial of the British and Foreign Bible Society in this Dominion.

It was during their stay in the capital that I had the opportunity of meeting these eminent missionaries and explorers. May I introduce them to you under their Chinese names—Feng Precious Pearl, Kai All Brave, and Feng Polished Jade. Loving art and music, and having a talent for languages, Miss Eva French, who is the elder of the two sisters, spent her earlier years on the Continent, thus achieving an education far in advance of most English girls of that time. Despite strong opposition she eventually forsook the conventionalism of Victorian society for the perils of life as a pilgrim-preacher in China. My first glimpse of her in her dark-brown coat of Persian lamb wool (purchased from a trader in Tibet) and high-crowned hat happened to be a rear view. When she turned toward me the serenity of her gaze and the strength of her features in repose were indicative of the unconquerable fearlessness of spirit which had enabled her to triumph over the horrors of the Boxer Rebellion, blizzards, brigands, danger, and hardship, that she might fulfil her calling.

I doubt if Miss Cable would be more than an inch over 5ft. in height; nor did her flat-soled footgear add appreciably to her stature. Nevertheless, her personality was as clear-cut and beautiful as the Lake of the Crescent Moon, which is set like a sapphire among the sand-dunes in the desert of Lob, and on its slender shore stand trees "whose leaves are silver and whose fruit is gold." Her handclasp was firm, her manner decisive and reassuring. She was simply dressed in dark blue, fastened high at the throat in the Chinese manner, and her small, eloquent hands sometimes toyed with the long, finely-linked neck-chain which sparkled against the sombre silk of her gown. Her voice had the resonance of one used to speaking with knowledg

Miss Mildred Cable in the inn courtyard at Ansi. " . . . wool was the chief export and hundreds of camels went eastward laden with the huge bales."



The caves of the Thousand Buddhas, "a veritable treasure-house of historic data," including the oldest specimen of a printed book so far known.

and authority, yet there was no harshness in her tone, but an all-compelling power to inspire her listeners with the conviction of her belief—a belief to which she has brought the keen mind of the scientist, the disciplined intellect of the student, in conjunction with humour, and a love of beauty which, even as a child, "tipped the balance of pleasure till it touched the index of pain"—a belief in the Word whereby all peoples of the earth may be led in the Way of the Prince of Peace.

On greeting the third of the Trio I had the instant impression: here is a person who has a gift for friendship. As I encountered the joyousness of her smile, the kindliness and understanding which are so integral a part of her nature, I could well realise what an outstanding contribution Francesca French has made to this unusual partnership—"a threefold cord is not easily broken." We talked of the Orient and particularly of China, where the three served for more than 20 years before beginning their trek into the desert country beyond. Miss French's love for the romantic city which constituted her first glimpse of China was apparent in the way she spoke of Peking. (Indeed, the touch of green at the neckline and the gleaming bead-embroidery which softened the severity of her black frock put me in mind of the jade the lapidaries of Peking carve into such precious commodities, commanding high prices in consequence. The coral-headed pin in her upturned hat also struck a distinctly Eastern note, as did her golden furs of Tibetan fox.)

The conversation turned to famous travellers whose literary talents have made their exploits household words; Sven Hedin, foremost of Asian explorers; Kingdon Ward, ethnologist and botanist, whose books on Himalayan flora depict "mountainsides of primulas" and forests of rhododendrons in full bloom; Owen Lattimore, a minister's son with a wonderful understanding of the Chinese people (I have a snap of this cheerful compiler of Mongolian customs and folklore which was taken at the Yosemite Conference by a New Zealand friend). But it was of the desert dwellers that Miss French waxed most fluent. Few who formed her audience will forget her description of those whom she and her companions met as they journeyed over the Gobi. For all sought something. Some sought wealth by selling merchandise which was scarce in the wilderness, receiving payment in gold dust and gradually accumulating a fortune, though not as we estimate one here. Some collected coloured stones and shipped them to Peking, incurring the comment of the nomads: "What a strange country these people come from that they have no stones and must come all this way to collect them." Some sought refuge from justice, adopting Mongolian manners and attire in an endeavour to change their identity. Botanists came looking for new plants and rare flowers and seeds; anthropologists searched after early traces of mankind; meteorologists sent up balloons to assist their study of air currents in readiness for future airways. The Gobi people themselves were a simpler, more direct folk, who had no hesitancy in discussing spiritual things, and their search was for truth.

The dominant landmark of the desert was the obo, or altar of stones raised to the unknown god. Every wayfarer made some offering at these shrines—a silken banner, coins, pretty pebbles, or perhaps a lock of hair, but the Trio who travelled the ancient trade routes seeking to save the souls of men always left copies of the Scriptures translated into the various languages for those who followed the highways of the desert.

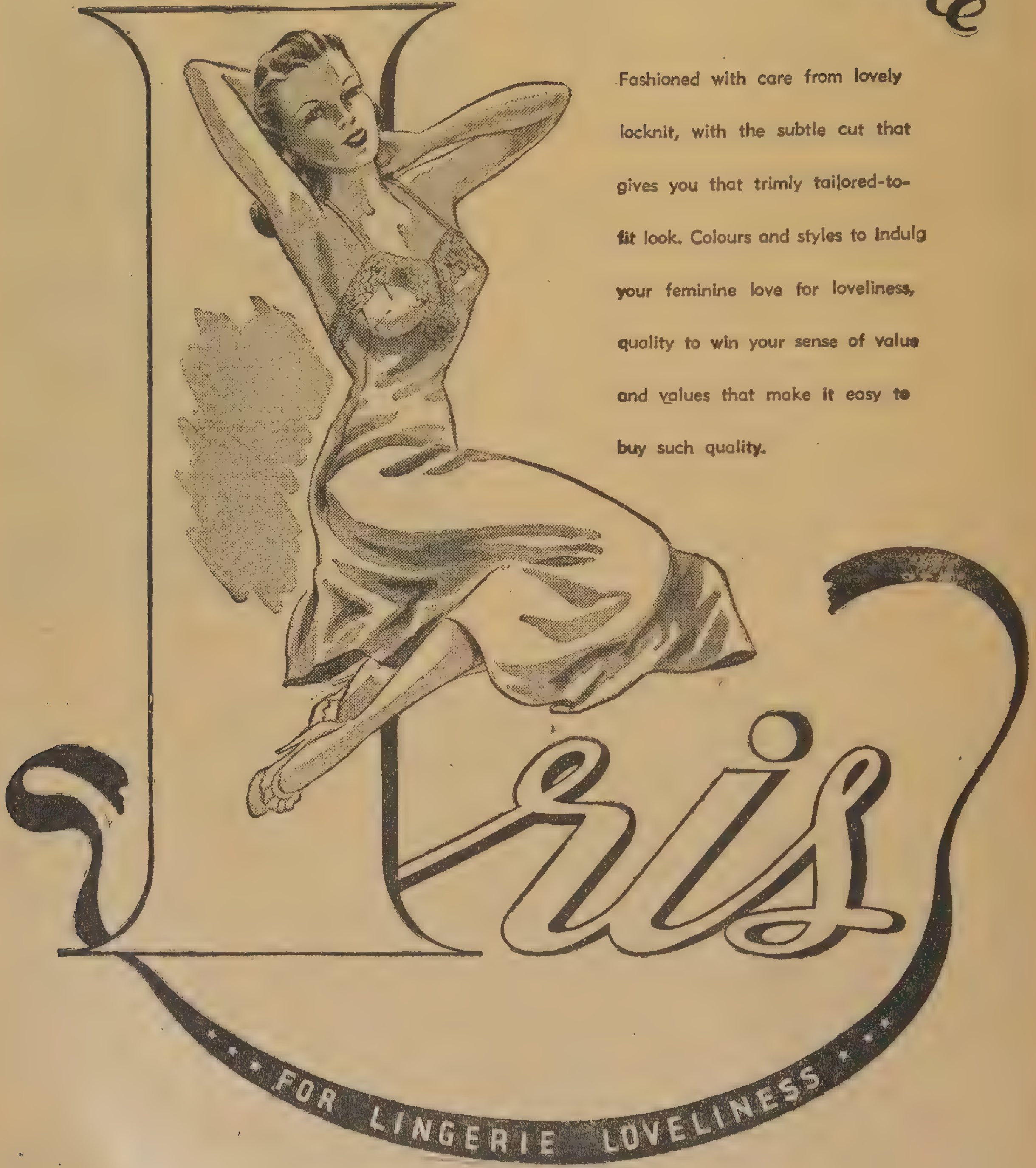
To these three noble women was entrusted the task of bringing Christianity to the peoples of Central Asia. The Trio have abundantly proved the verity of Christ's injunction in His sermon on the mount:

" Seek, and ye shall find; knock and it
shall be opened unto you.
For every one that asketh recieveth;
and he that seeketh findeth. . . ."

Mary

[Photographs reproduced from "The Gobi Desert": Mildred Cable with Francesca French. London. Hodder and Stoughton Limited.]

If it's Iris—it's irresistible



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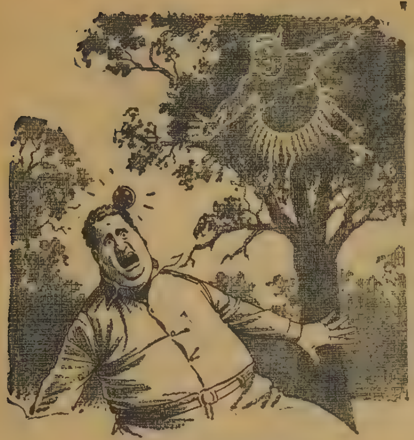
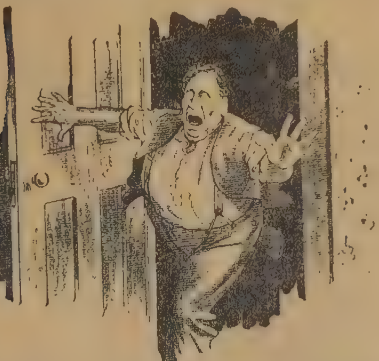
GHOSTS



By G. Thompson

SOME people believe in ghosts, and the Maoris sincerely believe that the spirits of the dead return to this earth in some form. There are good spirits and bad spirits. If you are one of those fortunate people, you have a good spirit guarding you. One of our local friends is so blessed, and he can return 7 miles from a neighbouring village at night without fear of interference or manifestations from any bad spirit who might be lurking in the vicinity.

Not so Hori, another neighbour. He will not venture out at night if possible. One evening a euchre party was held in the local wharenui. Several days before this function a well-known Maori had died in a neighbouring village. During the course of the evening Hori had occasion to go outside. A few minutes later the door burst open and in stumbled a panting, grey-faced, trembling Hori.

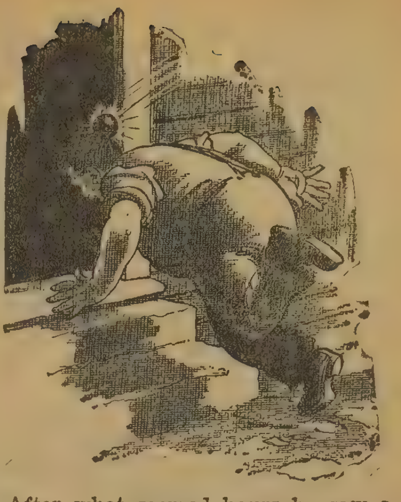


"Phew!" Breath whistled through his lips. "A kehua! It was Jimmy! Phew! Turned me right round! Phew!" Wiping beads of perspiration from his forehead he sank on to a nearby form, where in due course he recovered his composure.

Another friend suffered a far more harrowing experience at the hands of the Unseen. He was returning home at dusk. Growing several yards from the path was a large apple tree, and as our friend approached he saw someone sitting on one of the topmost branches eating an apple.

"Hi!" he called. "Throw me an apple. A big juicy one." To his amazement there was no reply, and the figure began to climb higher up the branch until it reached the very top of the tree. Still it continued to climb as though climbing up an invisible pole. Then our friend knew he had to deal with a kehua. Quickly he called his dogs to form a circle round him, because, as every Maori knows, if you keep yourself surrounded by dogs, the spirit cannot harm you. But he was too late. The kehua aimed an apple at the back of our friend's head. It hit him with such force that he was knocked unconscious. How long he remained so he does not know, but when at last consciousness returned inky darkness lay over the world. Fortunately his dogs were still surrounding him, but they were growling deeply in their throats, so our friend knew that they, too, sensed the presence of the spirit. In his heart was a great fear, fear which gripped him so deeply that it seemed to turn his bones to jelly and his blood to water. He could hear his heart pounding in his chest and feel a dull throbbing in his ears. He realised he would be lucky, indeed, to reach home.

Calling softly to his dogs to stay in a close circle, he rose on trembling hands and knees and crawled on all fours as fast as he could, allowing the dogs to lead him home. He knew it was no use his guiding the way, for the spirit would be sure to lead him in the wrong direction, but it could not mislead the dogs.



After what seemed hours he saw a light shining softly from a window and he knew he was near home. The light seemed to awaken courage in his heart, and he hurried on down the hill and through the gate. But the kehua was determined, was just waiting an opportunity to strike.

When our friend reached the door, the dogs could not, of course, encircle him completely, and he was just about to open the door when the kehua struck — struck swiftly and surely, again on the back of the head, and our friend fell heavily against the door, his sudden weight bursting its flimsy lock, and, to the consternation of all within, he sank senseless over the threshold.

When he recovered consciousness his wife told him that his brother, who had been ill, had died at dusk. Our friend knew then that the spirit had been that of his brother, who had wished our friend to accompany him on his journey into the other world.

TAPUAE-NUKU

Peaks piercing the silence of heaven,
Snows gleaming in luminous space.

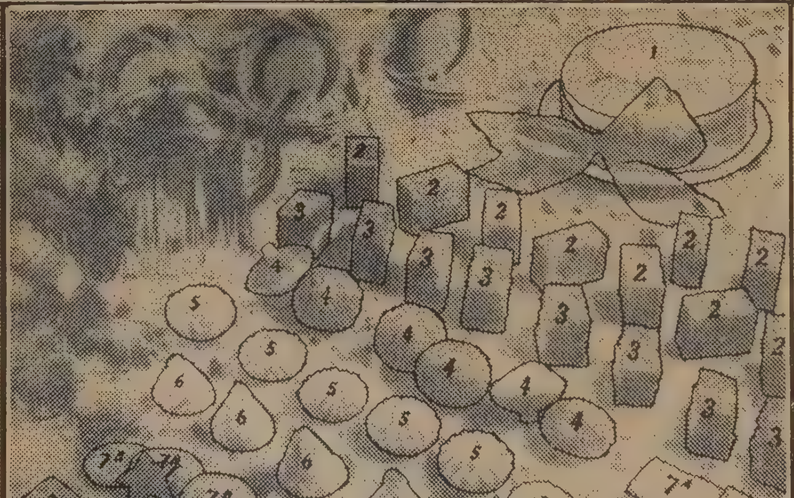
I do hope some day you may travel the Picton-Christchurch route and see Tapu in all its glory. The Maoris call it Tapuae-Nuku, meaning "footsteps of the rainbow." Nuku is a contraction of Uenuku, the Maori deity whose sign and symbol was the arch of the rainbow. In the early morning when the first rays of the sun shine on the great peak it shows forth all the colours of the rainbow. A New Zealand writer describes it thus: "Most exquisite of all is the vision in the early evening when the last of the sun is just touching the summit, but has left the mighty bases of the other peaks in the shade; when from the valley and the ridges that the sun has steeped all day there rises a thin blue haze like the smoke of a million fairy camp fires. The softness, the delicacy of this bath of colour, in which the bases of the old dark mountains seem to swim and dissolve, is hardly to be imagined by those who have not watched the magic turning of day to dark about the feet of these mountains."—"E.M.B.," Seddon.

GHOST STORIES

And I desire that you bring me no more stories of ghosts; for although I do not believe in such things, yet when one is awake in the night, one is apt, if one thinks of them, to have fancies that give one a kind of a chill, particularly if one opens one's eyes suddenly on one's dressing gown, hanging in the moonlight, between the bed and the window.

—Peacock, in "Nightmare Abbey."

Wisdom stops where self-conceit begins.



1. Economical Christmas Cake

2. Spiced fruit blocks

3. Trixies

4 Mushrooms

5. Pink flower cakes

6. Coconut cones

7a. "Candle" biscuits

7b. "Christmas tree" biscuits

7c. Star biscuits

Cakes and Biscuits for Christmas

By EVA TOPPING, *Rural Sociologist, Auckland.*

CAKES that are good to eat and pretty to look at are part of the Christmas season, but, as dried fruits are only to be obtained in limited quantities as yet and butter must be saved for export to more needy countries, the traditional fare, rich, iced fruit cakes, plum puddings, mince pies, and shortbreads, have to be cut down to a minimum. However, substitutes for them are to be found; attractive biscuits and small cakes which have Christmas decorations are not difficult to make. They help to "dress up" the table and give a festive air to family gatherings at meal times, while puddings and larger cakes can be made from recipes which are economical with fruit and butter.

XMAS CAKE

The recipe given is for a cake which is easy on the butter ration and requires only a small quantity of fruit. Of course, it will not keep as well as a richer cake and therefore should not be made long before the Christmas season. Decorations can be varied in many ways. Here are some suggestions, but other ideas will occur to home bakers.

Bake in a round tin, cover with white icing and pin real holly leaves round the side. Put leaves on the top in pairs with bits of red jujubes between to represent berries; pipe a seasonal greeting in brown or green icing in the centre. The holly leaves are easily removed from part of the cake when cutting slices.

Bake in an oblong tin, cover top and sides with white icing, and leave to dry. Then tie up with a broad band of red cellophane paper and an upstanding bow to give the effect of a Christmas parcel. Put coloured stickers and labels on the cellophane and pipe a message in one corner.

A round cake will make a "Yule log." Cover the top with mock almond icing from one of the recipes given, and the sides with cocoa butter icing piped on roughly or spread fairly thickly and marked with a fork to look like tree bark. Decorate the top with fine circles of the brown icing to make the tree rings, and the sides with green icing to give ivy leaves and stems.

The cake in the accompanying illustration is decorated with an orange bow, and a garland of green leaves and red berries made by cutting jujubes and pressing the pieces into the white icing before it dried. Stalks and lettering are in brown—a little of the white icing was reserved, coloured by adding cocoa, and moistened to the right consistency for piping with a few drops of warm water. A band of red cellophane with an important-looking bow gives a gay finish.

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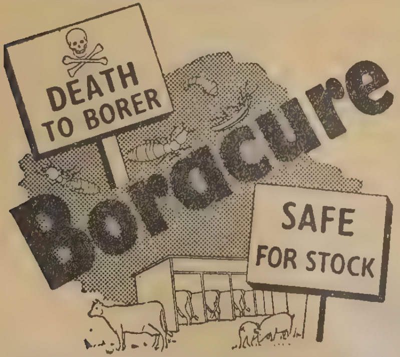

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Disease germs may also be harboured by foods and milk that have become polluted by flies, mice or rats. These pests eat the same food as humans, and when they feed they pass their germs on.

Food handlers, whether at home or in public eating places, KEEP YOUR HANDS CLEAN. Soap and water, frequently used, are the best safeguard.

AND KEEP ALL FOODSTUFFS PROTECTED FROM CONTAMINATION BY FLIES AND OTHER PESTS.

IT IS IN YOUR HANDS

to prevent food infection.

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Issued by the Dept. of Health

5c

Recipe for Christmas Cake

4oz. butter, 4oz. sugar, 1 tablespoon golden syrup, 8oz. flour, 2 level teaspoons baking powder, 1 level teaspoon ground cinnamon, ½ level teaspoon ground nutmeg, ½ level teaspoon ground ginger, 2-4 eggs, 1lb. mixed fruits, grated rind of 1 lemon, pinch of salt, milk to mix—about ⅓ to ¼ pint according to number of eggs used.

Cream the sugar and butter, add the golden syrup and grated lemon rind. Sprinkle a little of the flour over the prepared fruit and shake to cover. Sift the rest of the flour, spices, salt, and baking powder, and stir into the creamed-butter mixture alternately with the beaten eggs. Add the fruit and mix to a soft dough with milk.

Fill a tin which has been lined with greaseproof paper and bake in a moderate oven for 2 hours. Use a round 7in. tin or a square or oblong one of similar capacity.

A small quantity of ground almonds is to be available this year, but the two recipes for mock almond icing may be useful.

Almond Paste made with Biscuits

Equal parts of icing sugar and desiccated coconut—about ⅔ cup of each—4 round wine biscuits, well-crushed and rolled fine, white of 1 egg, almond essence.

Beat the egg white a little, combine the other ingredients, and mix to a paste with the egg. Flavour well with the essence. To make a soft but dry paste add more coconut and icing sugar.

Almond Icing with Soya Bean Flour

4oz. icing sugar, 4oz. soya bean flour, 2 tablespoons water, 1 large teaspoon almond essence, ½ teaspoon lemon essence, ½ teaspoon vanilla essence, 2oz. butter.

Melt the butter and water with 3oz. of the sugar. Remove from the heat and add the soya bean flour and the essences gradually. Turn on to a board and knead smooth, using the rest of the sugar to prevent sticking. Roll out to fit the top of the cake, or shape into leaves, etc., for decorations while still warm.

Take the cooled cake and brush over the top with melted apple jelly, thinned honey, jam, or golden syrup. Lay on the circle of almond paste and smooth on with the hand, pressing the edge of the paste out very thin to mould the top of the cake to a good shape. Leave to dry before putting on the white icing.

White Icing for Cake

1 unbeaten egg white, 1½ cups icing sugar, 1 teaspoon vanilla essence.

Put egg white into shallow dish, and add sugar gradually, beating with a wire whip until the mixture is of good spreading consistency. Add the vanilla and smooth the icing on to the cake. Leave part to set a little, colour, and pipe on for decorations.

Cocoa Butter Icing for Yule Log Cake

1 cup icing sugar, 3 tablespoons cocoa, 1 egg white, 1 teaspoon vanilla essence, 1 tablespoon cream or top milk, 2 teaspoons melted butter.

Add the sugar and cocoa slowly to a slightly-beaten egg white. Add the essence, melted butter, and cream to make the icing soft enough to put on the cake.

SMALL CAKES

Little cakes help to fill the table and make up for the smaller and less rich Christmas cake. The following recipes each save on one or other of the less plentiful or rationed goods.

Trixies

3oz. fat (butter, butter and lard mixed, or butter and milk dripping), 1 cup sugar, 1 cup flour, 2 well-beaten eggs, 2 tablespoons cocoa, ½ teaspoon vanilla essence, ¼ teaspoon salt, ⅓ cup chopped walnuts, ¼ cup sultanas, 1-2 tablespoons top milk.

Cream the fat, vanilla and sugar; add eggs and beat well. Stir in the cocoa and add the dry ingredients, mixing well; add the nuts, sultanas and milk. Spread in two 8in. square tins previously lined with waxed paper. Bake for 20 minutes in a moderate oven (350 degrees); cool on a wire tray. Put together with peppermint filling and cut into fingers.

Peppermint Filling

1 tablespoon hot milk, 1 teaspoon butter, ½ teaspoon peppermint flavouring, 1 cup icing sugar.

The peppermint filling can be spread on top or put in the centre, whichever is preferred.

Spiced Fruit Blocks

Mix together in a saucepan: 1 large cup brown sugar (or ½ cup sugar and ½ cup honey or syrup), 1¼ cups water, ⅓ cup mild dripping, 2 cups raisins, sultanas or currants, 2 teaspoons cinnamon, ½ teaspoon ground nutmeg, ½ teaspoon ground cloves.

Boil for 3 minutes and set to cool. Add 1 teaspoon of salt and 1 teaspoon of soda dissolved in 2 teaspoons of water. Stir in 2 cups of flour sifted with 1 teaspoon of baking powder. Pour into a greased and floured 8in. square tin. Bake for 50 to 60 minutes in a slow to moderate oven (325 degrees). Cool in the tin and cut into blocks. Roll in icing sugar, ice with lemon icing, or leave plain.

Lemon Icing

½ cup icing sugar beaten into 1 stiff egg white; add a pinch of salt and ¼ teaspoon of lemon essence or grated lemon rind to taste.

Mushrooms

¼ cup butter, 2/3 cup sugar, ½ cup top milk, 1½ cup flour, 1 egg, 2 level teaspoons baking powder, 1 tablespoon cocoa, ½ teaspoon vanilla, pinch salt.

Cream the butter and add sugar; add the unbeaten egg and stir well. Sift the flour, cocoa and salt twice and **stir** in gradually—do not beat—alternately with the milk. Add the vanilla and half fill very small greased cake tins. Bake in a warm to moderate oven (375 degrees) for about 8 minutes. Do not bake too long or the cakes will be tough. Cool on a wire tray. Make almond icing from the soya bean flour recipe, roll very thin, and cut out in circles to fit the cakes. Brush either top or bottom with warmed jam or honey and fit the paste on. Pipe the top with chocolate filling, using the icing recipe given below, or the one for Yule log cake. Radiate the lines of icing from the centre to give the effect of mushroom gills, and insert a stalk made from the almond paste trimmings. Leave the icings to set.

Pink Flower Cakes

Make the same mixture as the last recipe, omitting the cocoa and possibly a very little of the milk. Bake in tins or paper cases, and leave to cool. If the cakes are baked in tins, glaze the bottom with jam and roll in coconut coloured green by shaking on a saucer containing one drop of green vegetable colouring thinned with one or two drops of water. Do not make the colour too deep. Make pink butter icing and pipe the tops in petals of various shapes, leaving a few with centres filled with coloured coconut. Remember to glaze a circle in the centre of these or the coconut will not stay on.

Chocolate Butter Icing with Dried Milk Powder

1 tablespoon cocoa, 1oz. butter, 1 tablespoon golden syrup, 1 tablespoon water, 2-3 tablespoons dried milk, ½ teaspoon vanilla.

Mix cocoa and water and bring to the boil, stirring continually. Remove from the heat and add syrup and butter, beating occasionally until cool. Add vanilla and sufficient dried milk to make a soft cream. For pink icing omit the cocoa and use more dried milk than for the chocolate icing.

XMAS BISCUITS

Any good short biscuit recipe can be used for the foundation, as Christmas biscuits depend on seasonal

CHRISTMAS COOKERY . . .

decorations for their character. The accompanying illustrations show decorations of candles, Christmas trees, and stars. The icing recipe given for the Christmas cake is used and coloured with vegetable colourings and cocoa. Cut the biscuit mixture into circles, squares, fingers, stars, or any other shape. Christmas candles can be made of white icing, with yellow flames and rays. Christmas trees are made with green and brown icing on which coconut "snow" is sprinkled while the icing is wet. Stars can be plain or have radiating lines of yellow icing. Santa Claus can have a pale pink icing face, white icing beard, red cap, and brown icing dots for eyes. Christmas stockings, holly leaves and berries, mistletoe sprays, and bells are other appropriate decorations.

Biscuit Recipe

8oz. butter, ½-¾ cup sugar, 1 egg, 1 cup flour, 1 teaspoon baking powder, pinch salt, milk (if needed).

Cream butter and sugar, add sifted dry ingredients and beaten egg to form stiff dough. Roll out thin, cut into shapes, prick over, and bake about 12 minutes until lightly browned in a moderate oven (375 degrees). Roll a little of the dough at a time and dip the cutter in flour frequently.

Coconut Cones

Last, here is an old party favourite which you may have forgotten. Both coconut and sweetened milk are easier to come by nowadays and these little cakes are simple to make and good to eat.

Take ½lb. desiccated coconut and ½lb. sweetened condensed milk, and mix thoroughly. Form into cones and bake in a slow oven to dry out. Let the cakes colour very slightly.

Photographs by Sparrow Industrial Pictures Ltd.

A Birthday

My heart is like a singing bird
Whose nest is in a watered shoot;
My heart is like an apple tree
Whose boughs are bent with thickset fruit;
My heart is like a rainbow shell
That paddles in a halcyon sea;
My heart is gladder than all these
Because my love is come to me.
Raise me a dais of silk and down;
Hang it with vair and purple dyes;
Carve it in doves and pomegranates,
And peacocks with a hundred eyes;
Work it in gold and silver grapes,
In leaves, and silver fleurs-de-lys;
Because the birthday of my life
Is come, my love is come to me.

—Christina Rossetti.

SURVEY OF RURAL HOUSING

To Plan Country Women's Requirements

ALTERATIONS and additions to houses have been practically impossible of recent years, and there are many country homes which need extra accommodation for a growing family or for older sons returned from service with the Armed Forces.

Most women know what they would like to do to improve their home and have plenty of ideas for remodelling, building on extra bedrooms and living rooms, adding porches, or installing more convenient kitchen cupboards, wardrobes, and other storage space. Whether they can achieve the fulfilment of their ideas now or whether it is a case of "some time," they know from everyday living and working experiences exactly where the house plan fails, which features could be improved, and which are most satisfactory for the particular needs of their families.

One of the frequently-voiced complaints about rural houses is that the bathroom is not well situated for farm needs; another is that the telephone is very much more convenient if placed near the back entrance where the farmer can come from his work to answer it without leaving a wet or dusty trail through the house. Still another source of irritation is the lack of a special place for hanging streaming oilskins and soiled work clothes. What is your particular bugbear—or your pet idea for an improvement?

The Rural Sociology section of the Department of Agriculture is conducting a survey of rural housing, and seeks information of this type from country women. When the information has been collected and studied plans will be prepared which will meet the requirements of New Zealand's rural families and will be available to country people who want to build a new house or alter their present home to make it larger or more convenient. Record your preferences and dislikes on the Rural Housing Questionnaire. All the information you give will be confidential.

Fill in the application form for a questionnaire below and post it to the Rural Sociologist for your district.

The Rural Sociologists will also answer enquiries from country women about nutrition, preparation and preserving of food, and home management generally. Make use of this service.

North Auckland and Auckland:	Rural Sociologist, Department of Agriculture, AUCKLAND.
Taranaki, Wellington, Hawke's Bay, Gisborne, Nelson, and Marlborough:	Rural Sociologist, Department of Agriculture, WELLINGTON.
Canterbury, Westland, Otago, and Southland:	Rural Sociologist, Department of Agriculture, CHRISTCHURCH.

POST THIS TODAY

The Rural Sociologist,
Department of Agriculture,

....

Please forward me..........copies of the questionnaire on Rural Housing.

Name:...
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The Flower Garden in December

DECEMBER may be a holiday month, but it is a busy one in the garden, although a properly-planned garden need not be a "tie." If flower seedlings have all been properly thinned out, if weeding, staking, and disease and pest control measures are all well up to date, the gardener can go off on his holiday with a light heart without too much fear of finding disasters on his return.

Daffodils, tulips, hyacinths, and other spring-flowering bulbs should be lifted when the leaves have turned brown and withered, and not before, since next year's flowers depend on the food stored up in the bulb from this year's leaves. The bulbs should be lifted, the soil shaken off, and the bulbs with foliage still attached then put in single layers in boxes or trays to dry off. If put in heaps, they tend to sweat and many suffer severe damage. It is better to stand the boxes in an airy shed than outside; tulip bulbs are especially liable to injury if they lie out in the full sun for any length of time. When bulbs and foliage are quite dry the bulbs can be cleaned by gently pulling off the leaves and removing loose scales, but it is best not to separate twin bulbs, especially narcissi, since this tears the base plate and may cause the bulbs to rot. Bulbs which are soft at the neck or rotten should be picked out and burned, since they are probably infected by bulb mites. Narcissi and daffodils need be dug up and replanted only every three or four years.

Carnations should be layered as soon as the growths are long enough to enable them to be split up the centre and pegged down. The perpetual-flowering varieties are to be preferred in frost-free districts, since they provide a much longer succession of flowers than border carnations.

Flower Seed Sowing.—Many herbaceous perennials can be raised cheaply and in quantity from seed sown now, although, of course, most named varieties of plants will not come true from seed. Among the many perennials that can be raised in this way are Russell lupins (chip the seeds before sowing them), *Alyssum saxatile*, aubretia, anchusas, heucheras, and thalictrums. The last two are splendid for cut flowers. Seeds of all these should be sown in boxes or a small nursery bed, and the plants put out into the flower borders in the autumn.

[*Photo News Ltd.*

Plants grown as biennials, such as wallflowers, Siberian wallflower, forget-me-nots, sweet Williams, etc., may be sown from now on (next month in warm districts) in a seed-bed. The seedlings are best pricked out a few inches apart into a bed when large enough to handle, thus producing bushy, well-rooted plants suitable for planting in their flowering quarters in the autumn.

Hormones.—Since the article on using hormones for rooting cuttings was published in the "Journal" in August a statement on the subject has been received from the Director of the Plant Chemistry Laboratory, Department of Scientific and Industrial Research. Trials had been carried out by the staff of the laboratory, who confirm that cuttings which are not unduly difficult to root will usually do so more quickly and produce more roots after appropriate treatment with rooting hormones. Experience with cuttings which are usually very difficult to root shows that they are **not** likely to root more easily after hormone treatment. Leafy cuttings respond best, especially if the rooting medium is not much cooler than 60 degrees F. Cuttings are not so readily damaged through over-dosage when hormones are used in powder form. The use of transplanting hormones has not so far produced any clear-cut improvement in trials carried out by the laboratory staff.

Irises.—The **bulbous irises** start to die down at this time of the year. When leaves turn yellow the bulbs should be lifted, dried off, and then cleaned by removing soil and loose skin. The bulbs should then be stored till planting time in the early autumn. Bulblets can be saved if desired and sown, like seeds, in a drill to produce flowering bulbs after another season's growth.

Bearded and flag irises (those with horizontal fleshy stems, or rhizomes, which develop along the ground and flowers with "beards" on the lower petals) should be divided every year or two when they become overcrowded. It is best to divide and replant in June or July, when the plants are relatively dormant. These irises do best in a well-drained soil, rather on the heavy side, and well supplied with lime. The fleshy rhizomes are liable to rot if they lie in water-logged soil, and in situations liable to become very wet it is a good plan to grow them on raised beds to ensure drainage.

The Dutch iris variety Wedgewood flowers much more regularly than *I. tingitana*, with which it is closely related, and, although it has not quite such a good flower, it is at present more satisfactory as a garden plant.

Marguerites are often spoken of disparagingly because they are common and get very leggy and untidy. If grown for one season only and then thrown out, they can be relied upon to make a show in odd, rough corners where more choice and less robust plants would fail. Marguerites can be propagated at this season by means of cuttings, about 3in. long, taken from the ends of new shoots. The cuttings should be cut off squarely and cleanly at the bottom just below a leaf, using a razor blade or sharp knife, and about half the leaves should then be trimmed off. The cuttings should then be put in a shady position or in a frame, in moist soil, and kept shaded and moist for a few days. The white anemone-flowered and the pink varieties are more decorative than the common single white type.

Pinks are best replanted at least every two years, since old, matted plants produce only small flowers and look untidy. Propagate pinks now by pulling out pieces 2 to 3in. long from the centres of new shoots ("pipings") and inserting them to root in a cold frame without any further preparation. Water the pipings in with a watering can, using the rose, and cover the plants with a sheet of newspaper for the first few days. Provided the atmosphere in the frame is kept reasonably moist, the pipings will root in 3 to 4 weeks, and then should be planted out where they are to flower next year.

Roses.—Tie in new growths of rambler and climbing roses as they appear to prevent them from being accidentally damaged. Later they will be tied in permanently when pruning is done. When cutting flowers from bush roses always cut them with long stems. Other shoots will arise from lower buds and refurnish the bush. The budding season for roses starts as soon as the bark lifts readily.

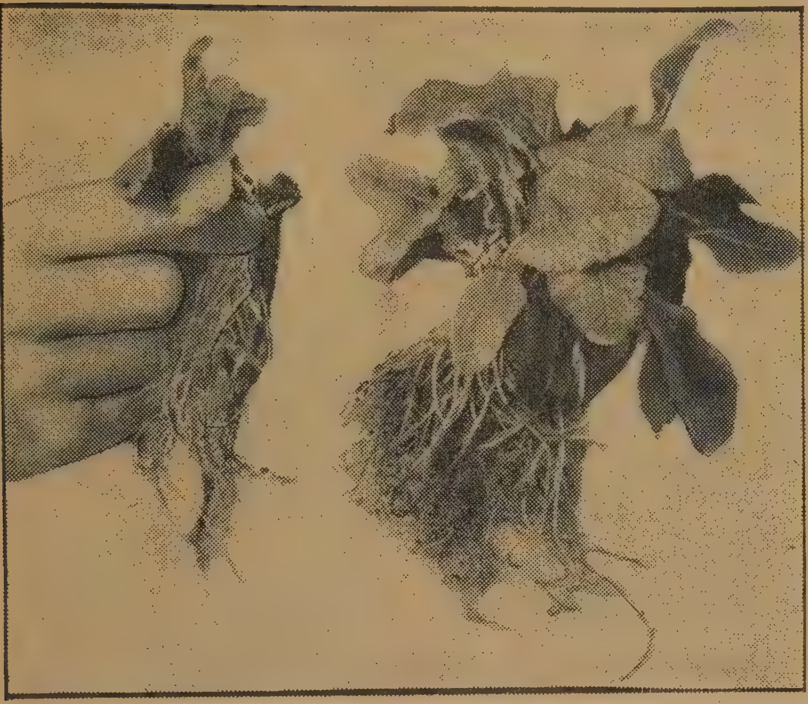
Sweet peas tend to become overcrowded and produce flowers with relatively short stems. The finest blooms on the longest stems are produced by growing sweet peas as "cordons," taking out all the side shoots and tendrils as they appear, but this entails a great deal of detailed work. However, it is worth while to go over the plants from time to time through the season and reduce the number of side shoots. It is, of course, most important to take off faded flower heads before the seed pods swell.

Suckers.—Almost all fruit trees and many ornamental shrubs and trees, including lilacs and roses, are propagated by the nurseryman by budding or grafting a piece of the required variety on to a root stock of some other sort. Many of the choicest varieties of fruit and flowering shrubs are relatively weakly growers, and the nurseryman usually uses, if he can, a vigorous type of root stock for these varieties to ensure that they produce as much fruit or flower as possible. Quite often new shoots (suckers) grow from the root stocks, especially if the roots have been accidentally injured by cultivating or digging deeply too near the plants. The sucker, coming from below the ground or from the foot of the main stem below the point where the bud or graft was made, can usually be recognised at once from shoots of the scion variety by the shape, colour, and size of the leaves and by their general appearance. All

A ten-year-old "cranberry" bush growing in a Wellington garden. The "cranberry" flourishes in places where no other small fruits could be grown at all. The bush has attractive, though not very conspicuous, pink flowers in spring, and regularly bears several pounds of sweetly-scented fruit, which can be picked in March or left on the bush until late autumn. Few garden plants scent the garden so powerfully as a "cranberry" covered with ripe fruits; but it is rather a cloying perfume which is not liked by everyone. (N.B. Although commonly known as "cranberry" in New Zealand, this is not the true cranberry, so popular in America *(Oxycoccus macrocarpus)*, but a Chilean shrub *Myrtus (Eugenia) ugni*, more properly referred to as the "Chilean guava.")

Subscriptions to the "Journal of Agriculture" (2/6 a year) may be paid at offices of the Dept. of Agriculture at Auckland, Palmerston North, Christchurch, or Dunedin.

THE FLOWER GARDEN IN DECEMBER



[*Photo News Ltd.*

Polyanthus and primrose plants should be divided up as soon as they finish flowering. The clumps are lifted carefully, shaken free from soil, and then pulled into a number of separate crowns, each with its own share of roots. The crowns should then be replanted firmly with the base of the lowest leaf level with the top of the soil.

suckers should be removed as soon as they are noticed, as they tend to take strength from the scion, and, if left unchecked, may ultimately swamp the scion variety altogether. It is useless to cut suckers off at ground level, since this leads only to a further crop which arises from the cut stump. Soil should be drawn away from each sucker until its attachment to the parent plant is exposed. If it grows from the main stem or a large root. it should be pulled out of its socket, if possible, or if too big, cut off **flush** with main stem. If the sucker arises from a small root, this should be severed on the tree side of the sucker and the sucker, with the root attached to it, removed altogether. If the severed root is left in the ground, it will probably form a new bud at the cut and produce further suckers (that is, it will behave as a root cutting).

Common Troubles

Aphis (green fly) is perhaps the commonest and most serious pest at this season of the year, since it attacks so many different types of plant and multiplies so rapidly. At the first sign of aphis attack spray with a nicotine spray, "paranaph" or a derris spray, or dust with derris dust. The effectiveness depends not so much on the type of spray or dust used as on the thoroughness with which it is applied. Sprays for aphis should always be repeated about a week later to kill those very young aphis which were not killed by the first application. Leaf-curling aphis cannot be killed by spraying unless this is done before the leaves have curled up. Hand picking is the only control when the aphis is protected inside leaves which have curled up.

Chrysanthemum eelworm attack is now easily recognised in infected plants, the lower leaves of which are parti-coloured, dying or dead, and shrivelled up. The only control now possible is regular spraying with nicotine sulphate to reduce migration of eelworm up the stem. This disease was fully described and illustrated in the July, 1946, issue of the "Journal," when control measures and other diseases and pests of the chrysanthemum were also described.

Geranium rust causes dark, chocolate-brown spots on the leaves, especially on plants growing in semi-enclosed or shaded positions. It can be controlled by removing badly infected leaves, especially in spring when new growth is developing, and then spraying the plants with a fungicide, which protects healthy leaves against infection, but does not "cure" leaves which already are infected. A close watch should be kept for new infection and at the first sign of fresh spots on the leaves the plants should again be sprayed.

While Bordeaux mixture would no doubt give the best protection against attacks of rust, its use on ornamental plants is not desirable because of the unsightly deposit left on the leaves. A more suitable spray can be made by dissolving 1½oz. of liver of sulphur (potassium sulphide) in 14 pints of water. Then make 1½oz. of wheat flour into a thin paste, free from lumps, with a little water; make up to 2 pints; boil till it froths, and add to the liver of sulphur solution. **This makes a valuable fungicide for use on ornamental plants, since it leaves little unsightly spray residue.**

Decorative Dahlias

DAHLIAS, if they are to be properly looked after, require adequate staking. The smaller kind are most useful for cut flowers, providing the stems are first plunged into boiling water. Many people hesitate to grow dahlias because of their being so frost tender and the difficulty of keeping the tubers through the winter. If the tubers are planted in September or early October, an early flowering season will result. There are many ways of keeping the tubers: they may be placed under a macrocarpa hedge and covered with straw, or put in a box of sand indoors, or removed and planted in the warmest and driest soil in the garden, preferably against the sunny side of the house. You may like to try spreading them out on the earth floor of an open shed and covering them with sand, a method I intend to try this winter.

Dahlias are gross feeders and need manure and water. It is a good idea to keep a bed especially for them—mine holds 60 plants—and trench it two spits deep, placing straw in the bottom spit and topdressing the surface with farmyard manure. The plants of the giant decorative dahlia require to be placed 3ft. apart, and the smaller kinds 2 to 2½ft.

Dahlias grow readily from seed and flower the same season. Amateur gardeners have as much chance of growing an outstanding bloom as professionals. During the dahlia season I look forward with delight to the blooming of such beauties as "Prince of Persia" (flaming scarlet), "Capri" (apricot merging into a yellow centre), "D. G. Wright" (a lovely cinnamon), and "New Glory" (red tipped with white).—**"Dianthus," South Canterbury.**

"A Courageous Act"

MANY and varied acts of heroism were related in the entries for this competition, from which it was clear that courage is displayed not in the battlefield alone, but in ordinary, everyday life.

First prize to "C.V.W.," of Waverley, for her well-written entry, and second prize to "Grannie," of Whangaparaoa.

First Prize

COURAGE! The very word is inspiring, and what deeds it brings to mind—deeds of valour on land and sea, in peace and war. Quiet courage plays its part every day among our ordinary fellow-men and women. The sick, the blind, the incurable give us great examples in their patient acceptance of their lot. We admire the valour of the fighting men facing fearful odds, but brave deeds are also accomplished in ordinary life. Perhaps nowhere is greater courage needed than in the backblocks, especially among women. Flood, fire, and accident strike quickly and deep, and demand ready resource and stout hearts.

Before the telephone became universal one country woman faced and won a terrible contest. She lived alone on the farm with her husband, and one day while going about her household duties she was startled to hear a cry for help. Rushing outside she saw a terrible spectacle. Only those who have watched the actions of an enraged bull can understand the horror which almost overwhelmed her when she saw her husband being gored by a bull, while prostrate on the ground. Though sick at heart, her mind worked fast. Dashing back to the house she seized a bucket, and filling it with boiling water, hurried to her husband's aid. She shouted to attract the great beast's attention to herself, and as it raised its head she threw the contents of the bucket in its face. Momentarily blinded by the water and pain, the animal backed away, enabling her to seize her husband and drag him to the fence and temporary safety. Then began the agonising journey across the yard, dragging the unconscious man as fast as her poor strength would allow. The bull, maddened by his new adversary and the escape of his victim, attempted to break through the fence, which mercifully held until she gained the house and closed the door, just as the beast reached it.

Then, doing what little she could for the injured man, she waited until the animal quietened down and moved away, enabling her to go for the nearest help a mile away.

She tended her husband through the long illness which followed his serious injuries, happy in his deliverance, and without a thought of her own heroism in facing danger which would make a strong man quail. Always quiet and unassuming, Mary Martin went her way, but her name is worthy of mention among the grand company of brave New Zealand women.

—"C.V.W.," Waverley.

Second Prize

AWAY back in the early sixties the little settlement of Wairoa, known today as Clevedon, was but a handful of white settlers, surrounded by bush, and with Maoris on all sides. Suddenly the peaceful atmosphere was torn by rumours of Maori attacks on the outlying settlers.

One young couple, the wife a mere girl of 22, with her first child a babe of months, were particularly disturbed by the tales of horror which came into the settlement. The husband, scarcely more than a boy himself, decided to send his wife and child away to Pakuranga, where her parents were living. But how to get there? He could not take her himself, as all able-bodied men were needed in case of a Maori attack, and they dared not risk travelling by day on account of hostile Natives. The only alternative was for the young mother to set off alone at night, trusting to the Maori's superstitious fear of the darkness. This she did riding a horse, and carrying her babe in her arms, all alone through the dense bush, over the hills, through miles of scrub, over streams and past swamps, till early morning brought her to her parents' home, just in time to miss a party of Maoris who shot two children not far behind her. She lived to the age of 86—hardy stuff, those old pioneers!

—"Grannie," Whangaparaoa.

Highly Commended

"Courage is not just to bare one's bosom
To the sabre thrust alone in daring.
Courage is to grieve, to hide the hurt
And make the world believe you are not caring.
Courage does not die alone in dying for a cause;
To die is only giving;
Courage is to feel the daily daggers of relentless strife,
And keep on living."

IT is unlikely that Clare has ever seen those lines, but they might have been written from the depth of her experience. Hers is a story of courage and strength of spirit, a courage which gains neither headlines nor medals, but which by its merit helps to set a standard and example to countless ordinary folk.

When 10 years old Clare was stricken with infantile paralysis. She was helplessly paralysed, every cure was tried, the little girl enduring agonising operations, but in the end the doctors had to admit that they could do nothing. At 17, stunted in growth, but wonderfully strong in spirit, Clare decided that she would become an artist; other members of her family painted well, but she had never tried. Her first attempts were crude, but she read books and practised and became absorbed in her new occupation. She announced to her startled family that she was going to art school. Her health became better, and gradually she gained more power over her limbs, and to art school she went. Her technique improved, and something of her own personality and power came to determine her artistic expression. Her teachers were amazed at her progress, and the wise doctors were forced to admit that there must be some power of the human spirit sharper than the scalpel. Today Clare holds a diploma of fine arts, and has been accepted by a well-known school of art in England to enable her to continue with her chosen career. So instead of being classed as "such a sad case," we may look at her for a valuable contribution to the art of this country, and I for one am proud to have met her.

—"Celia," Marton.

MY COUNTRY

I vow to thee, my country—all earthly things above—
Entire and whole and perfect, the service of my love;
The love that asks no questions, the love that stands the test,
That lays upon the altar the dearest and the best;
The love that never falters, the love that pays the price,
The love that makes undaunted the final sacrifice.
And there's another country I've heard of long ago,
Most dear to those who love her, most great to them that know;
We may not count her armies, we may not see her King;
Her fortress is a faithful heart, her pride is suffering.
And soul by soul and silently her shining bounds increase,
And her ways are ways of gentleness and all her paths are peace.

These verses, by Cecil Spring Rice, are set to music, and mean a lot to those who, living in freedom, have not forgotten the men who fought and died for them.—**From "Roundabout," King Country.**

First Aid For Poisoning

By C. MEACHEN, *Secretary, St. John Ambulance Association, Wellington.*

RISKS of poisoning by accident are so immense that widespread knowledge of first-aid treatment which can be applied in such emergencies may result in many people being able to render assistance or even save life. This article deals with those household types of poisons which are within easy reach of little folk, and could be taken accidentally with disastrous results.

THE effects of a corrosive poison are destruction of the tissues with which the poison comes in contact. Irritant poisons irritate or inflame such tissues, and there are other poisons which have various actions on different tissues of the body through circulating in the blood.

Most poisons are taken into the body by food or drink; some are inhaled and others are injected.

Symptoms

Poisoning should be suspected when a person who has been apparently quite well becomes ill on taking some food or drink or perhaps an hour or two after. The first thing to do, except of course with corrosive poisoning, is to induce vomiting. Tickle the throat with a feather or paper spill, or give an emetic. Remember that when a corrosive poison has been taken an emetic **must not** be given, as a poison which destroys the tissues on the way down to the stomach will, if vomited, do further damage to the same tissues on the way up.

Emetics

A note of these emetics should be kept in your first-aid cupboard: One tablespoon of mustard, or two tablespoons of common salt in half a tumblerful of warm water. When vomiting begins it should be encouraged by giving large draughts of tepid water. If the poison has been taken some hours before you can treat the patient, it may be advisable to give half an ounce of Epsom-salt, or an ounce of castor oil to clear the bowels.

Antidotes

When the nature of the poison is unknown a satisfactory antidote which will prevent or counteract the action of the poison is a mixture of magnesia and powdered wood charcoal given freely in water. Tea infused until it is black and strong coffee are effective and stimulating as well. Thirst may be relieved by sucking ice, or drinking water freely, which in most cases serves to dilute the poison.

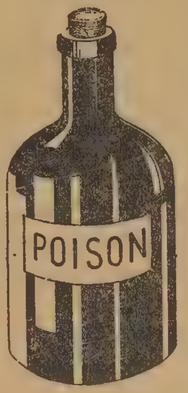
Pain is treated by hot poultices or fomentations over the abdomen or wherever necessary. Smelling salts may be placed below the nose to stimulate an unconscious patient. **NEVER** under any circumstances attempt to give an unconscious person anything liquid by the mouth.

In poisoning by corrosives the entrance to air passages may be inflamed and swollen, thus hindering breathing. If ice is handy, give some to the patient to suck. Iced or hot cloths, whichever gives the greatest ease to the patient, can be placed around the throat, and the air in the vicinity of the patient can be kept moist by steam from a kettle.

Treatment for shock, which frequently is an accompaniment of poisoning, may be urgently necessary when the actual poisoning has been dealt with. If breathing stops, artificial respiration should be commenced and the patient allowed plenty of fresh air.

Precautions

"Prevention is better than cure," and this applies in its truest sense to poisoning. Poisoning accidents in the home may be prevented if a few precautions are taken. Little ones usually want to taste what they see, and poisons should be kept well out of their reach. All liquid poisons should be kept in bottles easily distinguishable by touch so that the housewife can determine in a bad light or in the dark that the bottle contains poison. ALL poisons should be kept under lock and key. Bottles of medicine often contain drugs which will poison if more than the prescribed dose is taken. Children sometimes take sugar-coated tablets mistaking them for sweets, and poisoning is the result. If a dose of medicine produces untoward symptoms, no more should be taken until you have consulted your doctor. Tainted food should be rejected. "When in doubt throw it out" is an excellent rule to follow.



The first thing to do in any case of poisoning is to SEND FOR THE DOCTOR. Any bottle or other vessel out of which the patient may have taken food or liquid must be kept for the doctor's inspection, and any vomited matter kept as well.

A few common poisons which may be accidentally taken by children and even by adults are listed below and for each poison some symptoms and the appropriate treatment to give before the doctor arrives are described.

Strong Mineral Acids.—Symptoms are burning pains in the mouth, throat, and abdomen, and vomit may include brown or black blood. There is difficulty in speaking, swallowing, and perhaps in breathing. Other symptoms are collapse, pallor, cold, clammy skin, feeble pulse, and laboured breathing. Lips, skin, and clothing may be stained. **DON'T** give an emetic. Give plenty of water with whitening, chalk, plaster, washing soda, or magnesia, or even soapy water, followed by olive oil, milk and egg, or thick gruel. Keep the patient lying down and apply warmth to the body. If choking, put hot cloths around the throat.

Caustic Soda.—Swallowing of caustic soda causes an acrid, burning taste, burning in throat and gullet, pain in the pit of the stomach, and vomiting of slime mixed with blood and brown-coloured blood. Other symptoms are collapse, cold, clammy skin, weak pulse, and shallow breathing. The face is anxious-looking, and there may be hoarseness, cough, and difficulty in breathing. Again, **DO NOT GIVE AN EMETIC**, but give diluted vinegar or lemon juice, or dilute solution of citric or tartaric acid, thin egg and milk, oil, or gruel. Keep patient warm and the air moist.

Poisonous Berries and Plants are often responsible for accidental poisoning of children. Symptoms vary, but generally irritation of the stomach and bowels, vomiting, diarrhoea, and pain are evident. First give an emetic such as strong hot tea or coffee, castor oil, and, in the case of berries, a soapy water enema. Give warmth to the patient, and apply artificial respiration if necessary. For convulsions in a child a warm bath—about 100 degrees F.—may help. This temperature is above blood heat but not hot.

Camphor or Camphorated Oil.—Swallowing of these may be followed by pain in the stomach, vomiting tinged with blood, giddiness, delirium, jerky movements of limbs, and convulsions, which may be treated by an emetic, hot applications to the stomach, strong warm coffee through the mouth or the bowels, warmth, and a dose of Epsom-salt.

Symptoms of Fish or other Food Poisoning may not appear for some hours. Irritation of the stomach causing vomiting, diarrhoea, abdominal pains, cold, clammy skin, feeble pulse, and nervous symptoms are evident. Give emetics, copious draughts of tepid water to encourage vomiting, Epsom-salt, or castor oil; apply **hot fer-**

FIRST AID FOR POISONING . . .

ments to the abdomen, warmth to the body, and give stimulants when there is collapse.

Weed Killer and Rat Pastes usually contain arsenic, and rat paste sometimes contains phosphorus. When they contain arsenic encourage vomiting, give magnesia in water, milk, egg water or gruel, and hot applications to body, limbs, and abdomen. Keep the patient lying down, and when the poison has been neutralised by the antidotes mentioned above give full doses of castor oil. If, however, the poison is known to include phosphorus, **DON'T GIVE OIL** or **FATS**; instead, give ice for thirst and keep patient warm. For an emetic give Epsom-salt, white of egg, or thick gruel.

For **IODINE** poisoning give an emetic of a heaped teaspoonful of bicarbonate of soda in half a tumblerful of water, or a starch solution in cold water, thin arrowroot, or egg and milk.

Turpentine or Methylated Spirits poisoning should be treated with a mustard emetic followed by strong warm coffee for methylated spirits and barley water or gruel together with hot poultices to the abdomen and loins for turpentine.

To sum up—Send for the doctor in all cases of poisoning; keep the patient warm; don't give an emetic for corrosive acids which burn the mouth and leave a stain; and, with the exception of phosphorus poisons, give the patient a dose of castor oil.

"A Thousand Sunrises"

HERE is a book which should have a special place on your Christmas list. "A Thousand Sunrises" is neither a "guide-book, a travel book, nor an autobiography." It is a record of "miles, books, and people"; it is full of friendliness and wisdom, and is a veritable treasure trove of beautiful poems and prose excerpts. New Zealand writers whose works have been quoted in these pages include Eileen Duggan, Elsie K. Morton, Alice A. Kenny, the late Justice Alpers, Johannes Andersen, Oliver Duff, and Alan Mulgan.

When I was in Auckland I had the pleasure of meeting the author, Rita F. Snowden, whose love of books is so great that, following John Wesley's injunction "to see that every home is supplied with books," she journeyed for nearly three years from one end of New Zealand to the other with a van of books and a caravan for home. In this volume, as in her previous books, her deep appreciation of Nature's loveliness, engendered by a happy childhood spent in a "country place of green things," is clearly evidenced, and enhanced by such apt turns of phrase as "a Wedgwood day, the white clouds piling themselves up against the blue"; "the daisies run out in constellations to the water's edge"; "the ground rang under our feet like an anvil"; "the gentle mauves of night"; "an uninterrupted pastoral of cornlands"; "an odd phrase of the Gaelic may be heard . . . like music among the hills"; "the cannonade of thunder"; "lakes strung like jewels"; "silent galaxies of stars, luminous, immense."

She writes entertainingly on all manner of topics—sick visiting and swordfish and sign-posts; ducks and dreams and diaries; maps, motor-bikes, and Maori history. She also has the faculty of discovering unusual facts about the places she visits. For instance, did you know that New Zealand's first woman doctor practised in Waimate; that the Waitaki County Council has inscribed a large rock to mark 45°S—"half-way between the Equator and the South Pole"; that the little old Church of St. Stephen the Martyr, in Opotiki, is the only church in the world containing "a pulpit stained by the life-blood of its builder." I like her cameos of the folk she meets, especially those of the elderly farmer who has had little education, but knows "the haunts of birds, the habits of bees, the sculpture of the landscape, and the poetry of trees"; the resident of a straggling railway town who delights in Irish folk-songs and whose charming drawing-room is hung with Antarctic pictures by Dr. Edward Wilson, these having been given her in London by Mrs. Wilson; the collector who is a world-wide authority on Alexandre Dumas (a self-taught student of French, he is now learning Spanish in order to translate a MS which Dumas wrote in Spanish); the King Country housewife who as a child sat for the noted artist Harold Copping; the Scots minister whose father was a friend of the old "Doctor," of Isobel Cameron's stories.

Rita Snowden sums up her experiences very accurately when she says: "To greet these 'Thousand Sunrises' has been good—and exceedingly strenuous at times. . . . I have shared the hospitality of many hearts—and an enthusiasm for life. . . . I've talked with folk doing every conceivable type of work. . . . I've lived with the seasons—'made friends with wind and weather.'"

"GOING—GOING—GONE!"

ONE day my neighbour's small son was taken to an auction mart by his father and mother. While there he was very quiet, as it was all new to him, but he was evidently taking it all in. The next day he gathered all his toys and personal belongings and arranged them carefully in a row on the window seat. He then commenced his auction sale, picking up first one toy and then another and offering each one to imaginary bidders. It was most amusing to hear him call out 2, 3, 4, 10, etc., and then put the article down as sold before taking up another. The sale kept him occupied for almost a whole morning, giving his mother a chance to get her work done without the usual interruptions. His game was a first-class imitation of the real thing, particularly as he was only 4½ years old.—**"Del," Whangarei.**

NEW NEIGHBOURS

TO one living as I do in a rather lonely place with few near neighbours, your pages of the "Journal," with their bright paragraphs and helpful hints, are like a new friend who comes along every little while to cheer one up and help one on life's way. We are a happy little family, but until recently had no near neighbours at all. Now another couple have come to live quite close. Thus we are not so—I won't say lonely, as that is something I've never been!—isolated as we were. Companionship is something I have always craved though, and it is very nice having another young married woman to talk over the trials of bringing up a family and also to share our delight in our respective children. We look forward to your pages very much, and I especially enjoy your editorial, which always cheers one. I love the quotations you choose too, and am compiling a wee book of them as they appear.—**"C.B.," Tauranga.**

ARRANGEMENT OF FURNITURE

By NORMA K. METSON, *Rural Sociologist, Wellington.*

KITCHENS in well-planned modern houses are very similar in general appearance and in the placing of their equipment and fittings. These semi-standard arrangements are the result of much practical experience and research into labour-saving ways of doing the routine tasks which are carried out in every kitchen. In the same way furniture in other rooms should be placed for comfort and convenience in use. Groupings will not be standardised, of course, but they will be built up with a definite purpose in mind.

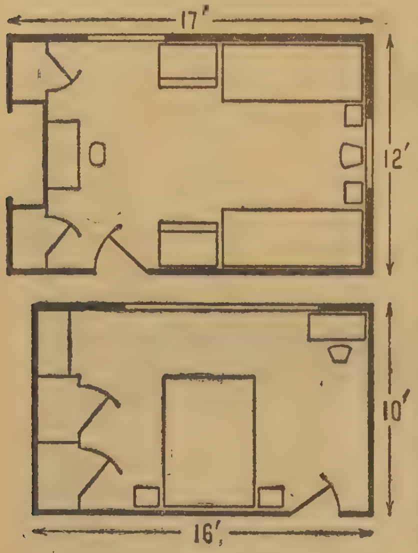
IF, after a normal family evening at home, you have to spend more than a minute or two putting furniture back into place next morning, it is likely that some permanent rearrangement would make your room more "livable." The same applies if it is difficult to move across the room without bumping into something, or to find a place to set down a tray, or to put a chair where the light is adequate for night-time reading. No one wants a room where chairs and tables must be set "just so" to within half an inch, but a well-ordered room is usually pleasanter to look at and more convenient to use than a haphazard one. The uses of a room will determine what will be put in it, and individual rooms will be discussed later, but, as usual, there are some general principles which will help in making all rooms attractive.

Focus of Interest

A room needs a focus of interest. This may be some structural feature such as the fireplace, a grouping or individual piece of furniture, or even a particularly important picture. A small room needs only one such centre;

Photograph in heading by Sparrow Industrial Pictures, Ltd.

ARRANGEMENT OF FURNITURE . . .

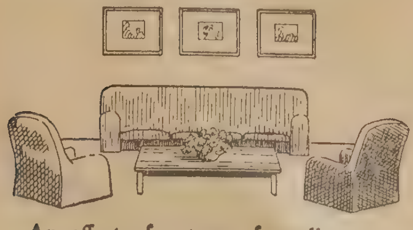


Top—A symmetrical arrangement of furniture is the easiest way to obtain a balanced room. Bottom—If irregular placing of windows and doors makes such an arrangement impossible, furniture may be used to offset structural features. In this room the double bed balances the long window on the opposite wall.

a larger room, or one which is used for several distinct purposes—for instance a living-dining room—may have more. Balance is necessary if the room is not to look top-heavy or lop-sided. Piano, couch and writing desk, for example, should not all be along one wall of a living room.

The easiest way to achieve balance is to have symmetrical arrangements as in the bedroom plan above. Rooms like this satisfy the eye and the sense of order, but are highly conventional, and irregular placing of windows and doors often makes such arrangements impracticable. Less stereotyped groupings are balanced by using articles which are about equal in importance but not identical, or by using furniture to offset structural features such as the window or fireplace.

Rooms look better if the largest pieces of furniture are parallel to the walls rather than at an angle, but if everything is placed so the effect is one of extreme formality. Chairs especially look more friendly if they are drawn up to the hearth or placed so that the occupant will see an attractive view from the window. Built-in fittings influence the placing as well as the amount of movable furniture. It should not be necessary to move other things away to reach cupboards and shelves. An end wall of bookcases will tend to dominate the whole room, and needs to be balanced by some important grouping of furniture.



An effect of extreme formality can be avoided by a friendly grouping of chairs.

Crowding a Bad Mistake

To crowd furniture is a bad mistake. Plenty of space is necessary so that people can move about a room in comfort, stretch their legs out in front of chairs, open drawers to their fullest extent, make beds, and so on. If space is limited, use should be made of built-in fittings, folding tables, and furniture which is light, small in scale, and versatile in use. In larger rooms the problem is to arrange and balance the furniture so that any effect of barrenness is avoided without the necessity for adding extra pieces merely to "fill up that empty space."

In any room it is safest to begin with a minimum of furniture and make additions gradually as needs become apparent. Many people find it almost impossible to throw out anything they have bought, and in consequence it is very difficult to correct mistakes. Also, most families, in the course of years, accumulate a great variety of material possessions, so if a house is full to begin with, it will undoubtedly be overflowing after a few years. It is much better to have room for expansion.

Well-planned houses provide for convenient arrangement of furniture. Rooms are frequently designed with particular arrangements in mind, and this tendency is of course accentuated by an extensive use of built-in fittings. Small or badly-planned rooms, however, may permit only one way of placing the furniture, and considerable ingenuity is required to make them comfortable and pleasant in appearance.

The hall gives visitors their first and last impression of the home, so the few necessary articles for it should be chosen and placed with care. Most hallstands are clumsy in design; a small table or set of shelves and a plain wall mirror hung in a good light are suitable substitutes. If possible, a recess or cupboard for coats and hats should be included in the house plan. If there is no such provision, a rack should be put up in an inconspicuous place. If there is room, one or two seats are useful additions.

The decoration of the hall should be related to the rooms which open from it. Patterned wallpaper or flooring may be used to give interest, or it may be gained from a picture, ornament, or attractive flower arrangement. Most halls are too small for elaborate decorations, and as the purpose of the hall is to give access to the rooms, it should not be cluttered up with unnecessary furniture.

Arranging a Living Room

The living room should be organised so that people can talk together, read, write, sew, play games, listen to the radio, or carry on an indefinite number of other activities. Its general needs, therefore, are good lighting (there should be one or more lamps in addition to the main light), flexibility, so that the fireside circle can include two or ten as occasion demands; plenty of storage space for books, games, sewing, etc.; and grouping so that people interfere with each other as little as possible. If, for example, a desk or piano is included, it should be in a good light and away from the most used part of the room.

Do not confine choices to conventional pieces of furniture if other things can be found which suit the purpose better. The usual upholstered suite may be too bulky for a small living room; a narrow, divan-type seat against a wall, with plenty of cushions, and small-scale fireside chairs will crowd the room less. Small pieces may be grouped together to give them weight and importance and improve the balance of the room—a bookcase beside a cupboard, for example. Nests of solidly-constructed wooden stools which can also be used as chair-side tables are useful in a small room, as they take up little space when not in use.

A frequent problem in living rooms is to find a suitable arrangement for summer, when sitting round an empty hearth seems foolish. With little trouble many rooms could be rearranged so that the window instead of the fireplace becomes the centre of interest. If the window is unsuitable—has an unattractive view perhaps, or is not large enough—the chairs and smaller pieces of furniture can be shifted so that attention is directed toward the couch or some other important object.

In a combined living and dining room the table should be placed where it is most convenient for serving from the kitchen, and both dining table and chairs should be of a type which can be used for other purposes when not needed for meals. In a lounge or sitting room which is kept for special occasions and not used every day the choice and arrangement of furniture are usually more formal than in a family living room. If such a room is used for entertaining, comfortable seating arrangements and ease in serving refreshments should be specially considered.

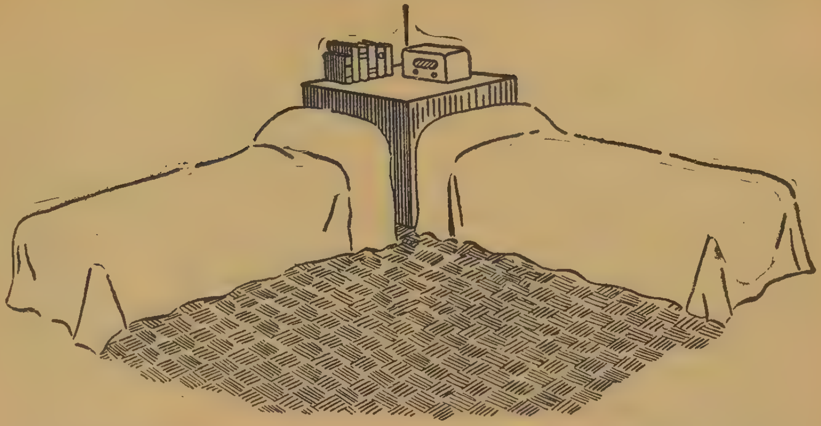
Placing of Beds

In a small bedroom there may be only one place where a bed can be put. If there is a choice, individual preference should be given at least as much weight as decorating principles. Some people really do feel much more comfortable if the bed is against a wall rather than standing out into the room; children almost invariably want their beds near the window. Beds should not, however, be placed in a direct draught, under a window where they will get wet if rain begins to fall, or extending across the doorway so that they appear like a barrier to anyone entering the room. Ease of access for bedmaking and cleaning should also be considered.

An unusual arrangement for twin beds which takes up a good deal of wall space, but leaves the centre of the floor clear, is to place them at right angles along two walls, using a square table to fill in the corner space. A double bed should not be put against a wall if it can be avoided.

Bedside tables, though not essential, are very convenient, especially for people who like to read in bed or keep a clock handy. Other furniture is usually arranged against the walls, which is a good practice, as it leaves the main floor space clear and lessens the risk of accident to anyone moving about the room in the dark. There should be room to open drawers and wardrobe doors without difficulty. The dressing table or mirror must be in a good light, preferably arranged so that both day and artificial light fall on the face of the person using it. If the dressing table is low, a stool or chair is necessary in front of it, and every bedroom should have at least one comfortable chair.

If the room is designed for other uses as well as sleeping, additional chairs will be needed and perhaps a writing desk or other equipment. A divan bed or built-in bed, which can be used as a seat in the daytime, with drawers or cupboards beneath, may fit better into this type of room than the usual bedstead, and it will probably be necessary to include storage space for other things as well as clothes. If a small room must be used for two children, built-in double-deck bunks save floor space, and perhaps leave room for a work table or extra storage. Space, simplicity, and really useful furniture are much more attractive to children than any elaborate scheme of decoration.



This unusual arrangement of twin beds leaves the maximum of clear floor space.

Think in Terms of Use

A "livable" room is difficult to define but easy to recognise; the furniture in it is chosen and arranged for convenience in use and attractive appearance. As with previous problems, furniture arrangement can be simplified by thinking in terms of use.

What is needed? A place for the children to do their homework? That means a good light, space for writing and spreading books and papers, not too much distraction from the radio or other members of the family, and warmth in winter. This problem can be solved and the necessary space and facilities provided in many different ways.

"Entertaining" in one home may be limited to the occasional visits of friends and neighbours; in another it may mean large parties and long holiday visits. An arrangement quite satisfactory in the first situation would be inadequate for the second. Many people have suffered unnecessary discomfort by allowing their furniture to dictate their way of living instead of choosing and arranging it to suit their requirements.

◆

"... AND NOT A BED MADE"

I HAVE been reading all morning. Do I dare to confess to methodical housekeepers that my housework is not done! I consider myself excused, however, as I have been engrossed in some of last year's "At Home" pages where I found balm for my conscience regarding the housework in Mary's article on "A Holiday at Home," and relaxed in a comfortable chair to gain all I could from other Good Neighbours. There were pars. which reminded me that today's bleak greyness would be replaced by sunshine, all the more appreciated by contrast; there were articles on travel both in New Zeland and abroad; there were glimpses of life in other lands—how I love a well-written travel story. Extracts from the works of well-known authors and poets have given me inspiration and courage because of the message of cheer and hope they contain.

So, from a mental standpoint, I feel I have spent the morning well and cannot resist the desire to write immediately and send my best wishes for the continued success of your pages. I hope other readers will find, as I have, that relaxation for a short period does most good if taken at a time when it is most needed, not when that taskmaster, the clock, indicates the correct time has arrived.

—**"Homely," Wairoa.**

◆

We each hold a key to happiness:
A cheery smile will open many doors.
—**"Peggy," Pleasant Point.**

Beauty despite the Beast

THANK you, Mary, for the "Journals." Your " Good Neighbour" pages are delightful, and I was particularly interested in your letter on Malta, as our son is stationed there with the Royal Navy. Many readers besides myself will be grateful for the article on "Lingerie Finishes" with its clear diagrams.

I have had so many letters asking what conditions are really like over here that you may be interested in a Hampshire-born American's reactions during a recent visit home. When he landed at Southampton his first words were, "Well, the old place hasn't altered much," but his impressions changed as we rode along the main road and we were moved to see his look of horror and grief when he saw the blitzed ruins of his home town.

He was surprised to see us womenfolk so comparatively well-dressed, although he thought the men he met could certainly do with new suits. Don't misjudge us! We really haven't taken all the men's coupons. Our menfolk are more conservative than we are: they won't go sockless, as we do, and their clothing is heavier and coupons consequently don't go so far, although the allocation is the same.

Our American friend was dismayed at the monotony of our diet, but said we all look well on it—as indeed we do. Our rations are adequate, though we long for variety. Fruit, especially, would be welcome. However, the Government are hoping for better supplies. Fruit crops went to jam manufacturers, which ensures a fair method of distribution. I wonder if you realise how deeply we appreciate New Zealand's generosity in forgoing "points" to send us extra food. These luxuries go to our hospitals, orphanages, and similar institutions and provide welcome additions to their diet.

Our American thought our homes rather shabby and said we would all be brighter for new curtains and covers. He remarked that he got tired of seeing so much plain white "utility" china. Not half so tired as we are of it! But one sunny evening, as we wandered round the beautiful countryside, he was heard to observe, "What are such inconveniences when we have seen the incomparable loveliness of Hampshire's downlands?" Although not a Hampshire woman, I had to agree there was little to equal its charm on such a day. The long stretches of rolling grassland strewn with scabious, starred with yellow rock roses and other wild flowers, the sweeping line of low hills with their fine clumps of beech trees looked magnificent in the fading rays of the sun.

Warm greetings. Yours sincerely,

—**Iris M. Jones.**

Though I live in a world where wars and winds are boisterous, I want to keep my heart a deep, calm lake.

—*(An old proverb).*

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Mrs. Active Acto... off to town!

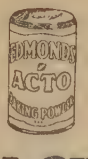
Her baking is done to perfection . . . and she is proud to give you the recipe of her favourite Brown Health Loaf.

1 large breakfastcup flour, 1 large breakfastcup wheatmeal, ½ teaspoon salt, 2 good teaspoonsful Edmonds Acto Baking Powder, 1 dessertspoonful golden syrup, ½ cup milk, ½ cup water.

Mix well all the dry ingredients, dissolve the golden syrup in the hot water, and when cold add the milk; stir all together into a light dough, put into a greased tin and bake in a fairly hot oven (425° F.) for 1½ hours.

Baking is no trouble at all for Mrs. Active Acto . . . she has *proved* that baking powder, accurately measured, is the foundation of successful cooking. She uses . . . always . . . Edmonds Acto.

You'll bake better if you always use



EDMONDS

ACTO BAKING POWDER

The Ace of Rising Agents

15.6

MARY'S AT HOME

WHAT a number of new "Good Neighbours" join our circle each month. We had a good laugh over "Moon Maiden's" paragraph about bath night. I imagine her enterprising boys cause her many a headache!
—**"Homespun," Halcombe.**

WE have recently started getting the "Journal" and I must say I enjoy the women's section very much. I would like to contribute, too, if I may, and trust that I may become one of your "Good Neighbours."—**"Hopeful," Te Awamutu.**

MAY I join your friendly circle, please? I enjoy the "Journal" immensely, studying it from cover to cover. Yes, I really study it, being a very new farmer's wife straight from the city pavements and the bright lights. I do love my new life, though, and perhaps it is through my own ineptitude at present that I find my days very full and tiring. Through the interesting and informative pages of the "Journal" I am sure I will find plenty of inspiration to overcome my difficulties and supplement my inadequate knowledge of country life and farm arts and crafts.—**"Per Ardua," Otago.**

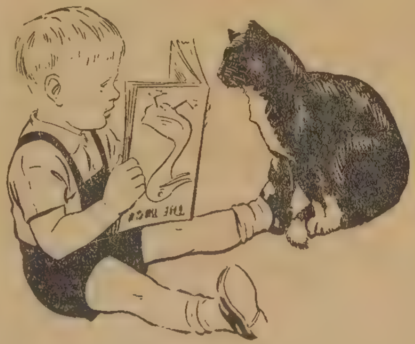
THIS is the first time I have written to the "Journal." One of the quotations in the recent competition moved me to make the effort. It was: "If you have two loaves, sell one and buy a lily," and was sent in by "E.W.," Waiheke. The one I knew is an old Persian verse and is attributed to an aged philosopher.

"If of thy worldly goods thou art
bereft,
And from thy slender store, two loaves
alone are left,
Sell one, and with the dole,
Buy hyacinths to feed thy soul."
(Sadi, 12th century Persian poet.)
—**"Q.A.," Manurewa.**

[Another version of the same idea is in the form of an old Chinese proverb: "If you have two pennies left, spend one on a loaf and one on a flower. The bread will give life, the flower a reason for living."—MARY.]

I HAVE a great weakness for humorous films and books, as I think a good laugh is worth all the bottles in the chemists' shops. — **"Rosemary," Levin.**

SUSAN has started school now and her brother takes her on the bike in the mornings and she trudges two miles over the paddocks home. She loves every minute of it and seems to be getting on with her reading very well. She sings with more verve than correctness, though she keeps fairly well in tune. I heard her singing, "Vive la, vive la, vive l'amour, Vive la come to my knee!" I wonder what she thinks it all means. Every week she brings home a Beatrix Potter book and we all enjoy them. They are charming, aren't they? Quite ageless, too; we had them when we were children, the best part of 30 years ago. We had "Jemima Puddleduck" last week. David (aged 4) learnt it nearly all off by heart and he was "reading" to the cat all about "the hospital (hospitable) gentleman with the sandy whiskers."—**"Bee," Timaru.**



I WAS walking down our road recently and passed where the fire had gone—the one which menaced our farm. It was surprising to see how seedlings were springing up, and some trees not so badly scathed were renewing their leaves. So I hope that in those vast regions where such a lot of valuable native bush was destroyed there may be a partial recovery.
—**"Mrs. B.," Kati Kati.**

OVER a cup of tea we debated the subject of good neighbours. I like to visit people who are pleased to meet me at any time of the day, and I also like folk to come in just as they are, no matter the state of my house or whether the tins are full or not. I also hope that "Lonely Londoner" is not so lonely now, and if there is any help I can give her, I will be only too pleased, as I am from London, too, and know what it is to be lonely.—**"Chum," North Auckland.**

MAY I join your happy circle? I do enjoy the pars. and poems, the garden and cookery notes. Here is a verse readers may like:—

The little cares that fretted me,
I lost them yesterday,
Among the fields above the sea,
Among the winds at play,
Among the hushing of the corn,
Where drowsy poppies nod;
Where ill thoughts die and good are
born;
Out in the fields of God.
—**"D.E.G.," Wakefield.**

EVER since I made the acquaintance of the "Journal" at the beginning of this year I have enjoyed the women's section more and more. I loved the replies to the "Favourite Quotations" competition. Surely with so many women forming the backbone of our country we can strive for a lasting peace. We must be more serene in ourselves and more understanding of others.—**"Joysabel," Rakaia.**

PLEASE may I join your "Good Neighbours?" We are not on a farm at present, but live in a country community. My husband is a miner and in common with most of the underground workers has a great interest in farming and farmers. I matriculated in agriculture, so naturally I enjoy the "Journal" and am particularly interested in the women's section.—**"Davida," via Te Kuiti.**

MY husband and I read the "Journal" with great interest and find it most instructive. It seems to be edited with imagination and vision, and should do much to help in the task of making the younger generation wish to earn their livelihood from the land. Your pages are a source of joy to me and I would like to join the "Good Neighbours" if I may.—**"Grey Duck," North Auckland.**

COMBATING FLEAS IN THE HOME

IN the second book of Moses it is recorded that God sent a plague of insects upon Pharaoh and his people. Since that time mankind has continued to suffer to a degree in keeping with the opportunities afforded for insect breeding, and in some tropical countries it has been uncertain whether man could avoid being displaced by the myriads of insects, writes an officer of the Department of Health.

Of all the insects that invade our households, the most irritating is undoubtedly the flea. There are some 500 varieties of fleas known, the most important from a public health point of view being the human flea and the various rat fleas. The form and appearance of a flea need no description. The only anatomical fact requiring mention is that the legs are so modified that the insect is capable of executing quite remarkable jumps.

The white eggs are usually laid singly. The female lays about a dozen eggs at a time. In from two to ten days they hatch out into little grub-like larvae. After the larval stage the flea spins itself a cocoon and from this the adult emerges. Eggs are not usually laid on the host of the adult parasite, but in cracks in the floor, wall crevices, bedding, carpets, and cushions

Flea larvae are very active, and can move about with considerable rapidity. Their food consists of various organic refuse that lies about where they are hatched. The adult, when it first emerges from the cocoon, is fat and can live for some time without food. Ultimately, human and rat fleas find their natural hosts. They usually shun daylight, and are attracted by warmth. Their food, of course, is the blood of the host.

The effects of a flea bite vary greatly in different persons, but the usual result is irritation and itching. This is caused by the salivary secretion of the parasite. The mark of the bite is usually hard, red, and irritating. Generally the effect wears off in a few hours. The flea may, under favourable circumstances, live for a period of eighteen months. The total number of eggs laid by the adult female may reach 450.

Carrier of Plague

The most dangerous flea is the rat flea, which is the carrier of bubonic plague. The special bacillus of plague is sucked by the flea from the blood of an infected rat, and is spread to other rats when the flea feeds. Plague-infected fleas may also bite human beings and so give rise to a case of bubonic plague. Therefore, in the process of cleansing rats from shops, buildings, etc., when there is any suspicion of plague, extreme precautions must be taken by the operators to prevent being bitten by fleas.

Victor Heiser, in his book "A Doctor's Odyssey," states that one day the editor of the "Manila Daily Bulletin" was taken violently ill, and 48 hours later died. While the sanitary squad was carrying out the insecticidal and other anti-plague measures in his office an inspector pulled the upper drawer of the editor's desk out to the end. Live fleas were seen hopping around, and in the very back lay a mummified rat. A hole in the rear of the drawer showed the manner of its entrance. After the rat had died its fleas had deserted it. The editor was presumably working in his shirt sleeves because of the heat, and must have reached into the drawer and been bitten by one of the fleas.

Rats on Ships

From 1901 to 1911, 20 cases of plague were reported in New Zealand, but since 1911 no further cases have occurred. Special measures for the prevention of the migration of rats from ships and for their destruction on board must be carried out if ordered by the Department of Health.

The maritime world recognises that rat life aboard ships is a menace to health and an economic burden. For this reason shipbuilders are now endeavouring to provide ships of rat-proof design and construction. By an international agreement made in 1936 all ships must obtain a deratisation certificate every six months, or, if the examination of the ship fails to disclose the presence of rats, a deratisation exemption certificate.

With proper rat control keeping the number of rat fleas down to a minimum, there is very little danger of the introduction of bubonic plague. However, it has been discovered that other animals besides the rat, the ground squirrel of America, the marmot of Asia, and the gerbille of South Africa, can be plague carriers.

Causes of Infestation

The chief causes of flea infestation in a home are:—(1) Nearness to stables, fowl runs, etc.; (2) want of cleanliness, particularly in allowing dust to collect; (3) allowing flea carriers, such as cats, dogs, rats, mice, etc., free access to living rooms.

It must be borne in mind that, unlike lice, fleas may remain active while a house is closed and resume their normal routine when the house is reoccupied. If it is found that one has become the host of a flea, it is wise to search one's garments while holding them over a large receptacle filled with water. Then, if the flea eludes capture, it will probably drop into the water.

Treating an Infested House

In treating an infested house, all domestic animals should be cleansed, rubbish removed, and all floors thoroughly washed with a solution of coal-tar disinfectant. One of the best ways of ridding an infested room of fleas is to sprinkle or scatter at least 5lb. of flaked naphthalene over the floor and to keep the room tightly closed for 24 hours. Any coverings used for the floor should be thoroughly aired and beaten and then sprinkled with kerosene, pyrethrum powder, or naphthalene.

Preparation of Emulsion

Outbuildings should also be treated, special care being taken to remove any collections of dust and rubbish. Kerosene emulsion may also be sprayed on, and a creosote preparation will be found useful. Pure kerosene should not be used, but should always be emulsified with soft soap and hot water.

A British Museum booklet on this subject states that an emulsion which, when diluted with water (1 in 20 or more) will kill all fleas that it touches on floors, clothing, or in the coats of animals, may be made from soft soap and ordinary mineral burning oil, either petroleum or kerosene. It is prepared by thoroughly melting three parts of soft soap in 15 parts of water. While the mixture is still hot, add 70 to 100 parts of the oil gradually, stirring vigorously. The proper emulsification depends upon the gradual addition of the oil and thorough agitation. The final mixture should be white and creamy with no free oil.

Oil emulsions made with the light or more volatile oils are quicker in action and more penetrating than those of heavy oils. They are, however, more rapidly dispersed by drying off and evaporation. The nature of the climate and locality must be considered.

Treating Dogs and Cats

Infested dogs may be washed with a 3 per cent. solution of cresol. This mixture is not recommended for cats, which should be dusted over sheets of paper with pyrethrum powder. This stuns the fleas, causing them to fall off on to the paper.

The irritation of flea-bites may be allayed by bathing with weak ammonia or a 2 per cent. lotion of carbolic acid. Special fumigation measures have to be used to treat ships and buildings infested with rats and rat fleas. These measures, however, should never be used except under the supervision and control of a person specially trained and qualified in the method.

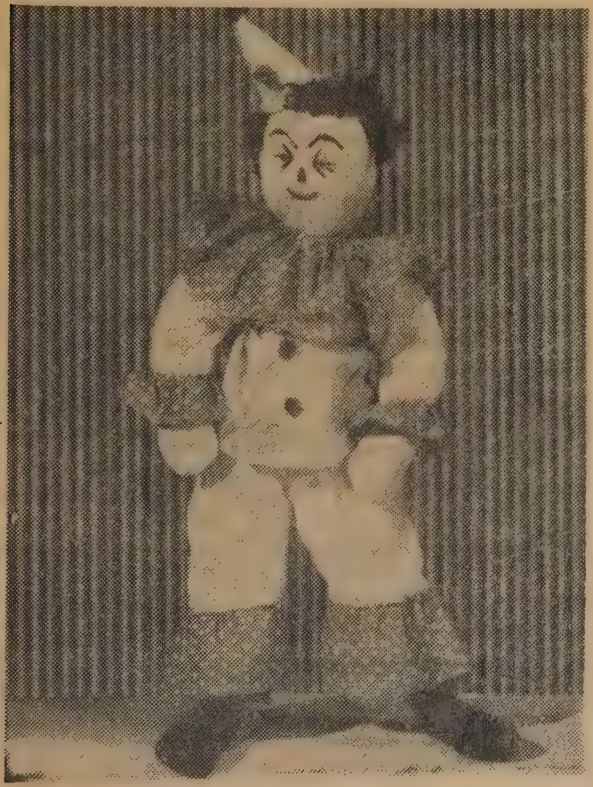
Simple Home-made Toys for Christmas

By EVA TOPPING, *Rural Sociologist, Auckland.*

HERE are some easy toys to make for Christmas presents. Nearly all of them can be made without much trouble or expense, and luckily the toys children love most are usually simple things which have a good chance of turning out well when tackled by amateur fingers. A little patience, imagination, and skill, odds and ends of cloth, ribbon, cardboard, paste, paint, pegs, tins, and cotton reels, and a lot of enthusiasm—with these materials a great deal of fun may be had making toys which the younger children will hail with delight.

CLOTHES pegs have many possibilities. With faces drawn on the knobs and scraps of cloth for frocks they make dolls for little sisters or accompanied by a brightly-painted tin with dull edges they make a fascinating toy for baby brother, who will love the noise they make.

Tins make splendid stilts. Two painted scarlet, with holes near the top to take clothes line handles, will give hours of fun and good exercise. Pierce two holes in each tin from the outside with a thick nail, and enlarge them with a tin-opener. Put the tin on the heel part of a boot last and hammer the outside until the jagged edges are flat. Insert the lengths of rope and tie a firm knot at each end to come inside the tins.



The clown.

Rattles can be made from half-pound cocoa tins; put tiny pebbles inside and cover the whole tin with brightly-coloured cloth, stitching the cover on securely so that the lid cannot come off. A thick string attached at one end will turn the covered tin into a pull-along toy.

Match Boxes and Cotton Reels

Match boxes and wallpaper make all kinds of toys. Boxes covered on all surfaces with paper and having pictures on the largest sides make grand picture blocks. In plain paper covers of various colours the boxes can be stacked to make houses, fences, stables, kennels, or any other thing the young builder wants. Six piled together in two rows and covered on three sides, top, and bottom with wallpaper make a fine chest of drawers for a dolls' house; small brass paper-fasteners can be put in for drawer knobs.

Two or three empty cotton reels painted in gay colours make fascinating toys to drag along. Six or seven, each in a different colour, and a football bootlace will keep the little one who is learning to do things busy playing at stringing beads.

Soft dolls are always favourites, and the two described here can take any amount of punishment, for there is nothing to break, and if you use strong thread and firm stitches, nothing will come off either!

Copy the pattern shapes from the chart on the next page by drawing or folding squares of paper and marking the points where the heavier pattern lines cross the squared lines. Join the points by smoothly-curving lines. Cut round the outlines and use them as patterns for cutting the cloth. The toys can be made any size by altering the size of the squares, but they should not be too small or the seams will be hard to manipulate. One-inch squares will make the dolls about 13½in. long.

The Clown

This funny fellow's head and body are made from white or cream material; the good parts of discarded interlock underwear are suitable, though practically any kind of cloth will do if it is not too bulky. Cut out the shapes, leaving turnings; take the leg and body parts and stitch round them by machine or backstitch as indicated, leaving openings for inserting the stuffing. Snip at the curved

SOFT DOLLS ARE ALWAYS FAVOURITES

The negro.

edges, turn the parts right side out, and stuff them. Wadding or rag snippings can be used, but pack the stuffing tightly into the ends of the legs and hands, using a pencil, wooden skewer, or the knob of a knitting needle to work it well down. Sew up the leg opening and stitch the legs to the body.

On the front of the head draw a comical clown face, using the illustration as a guide. Be sure to get the features in a good position; the eyes should come about the middle of the circle or the whole face will be too high. Embroider the nose and mouth with scarlet stranded cotton (two strands will be sufficient), the eyes blue with black lines, and the eyebrows brown. A piece of stiffened muslin tacked behind the face before the embroidery is begun is a great help in keeping the stitching unpuckered. Join the two head pieces, turn and stuff them, and join the head to the body. Make his ragged hair with black wool sewn on in loops, putting a backstitch over each one and working the rows close together (Fig. 1); clip the looped ends and trim them to shape.

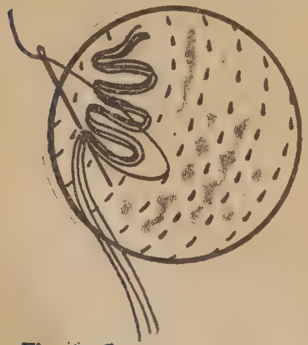


Fig. 1—Sewing on wool in loops for hair.

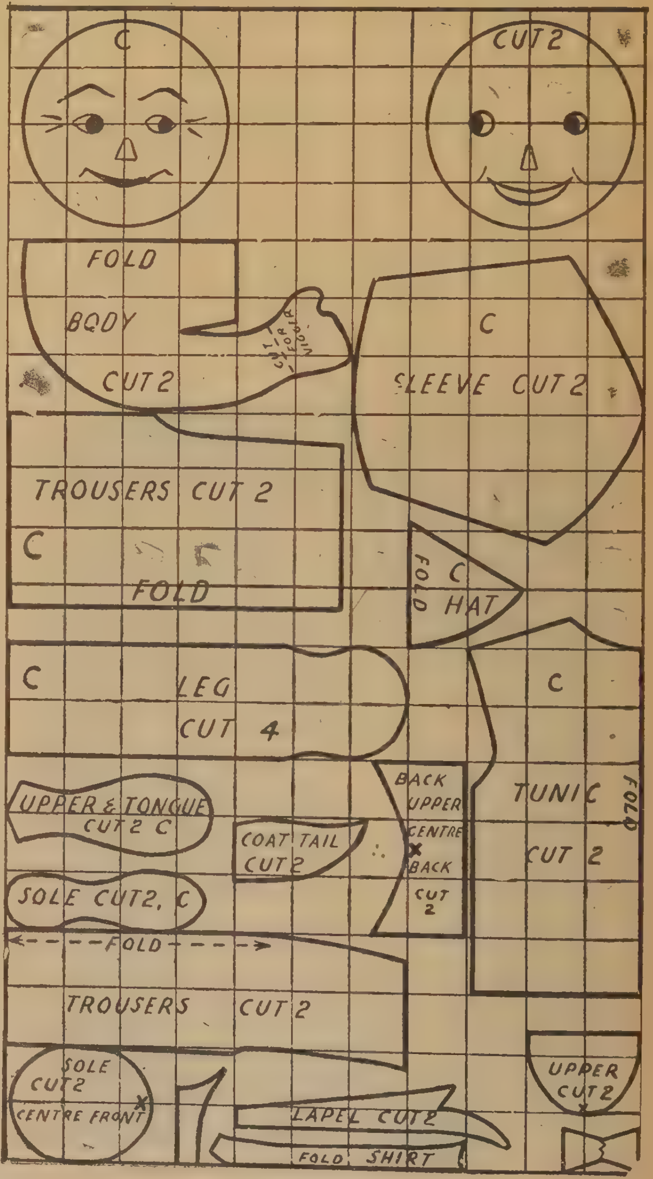
Now make the trousers in white cotton material—washed flour or salt bags will do very well. Give him a wide, very full frill round the neck and a narrower one at the cuffs and on the trousers. Red and white spotted print was used for the clown in the photograph, but any brightly-coloured, small-patterned material will serve. The hat is made of a small piece of white felt, with scarlet bobbles to match those on the tunic. The boots are of black felt, very long and narrow, laced up with black embroidery cotton or wool. Pieces of black kid and white doeskin cut from old gloves can replace felt for the boots and cap.

The Negro

Sambo's head and hands can be made from good pieces of an old black stocking and the best of the pair used as stuffing, or he can be made entirely of felt.

If stockings are used, make very close, firm, back-stitched seams and leave turnings when cutting the pieces; if felt is used, cut on the pattern line and leave no turnings.

PATTERN CHART FOR SOFT DOLLS.


C
CUT 2
FOLD
BODY
CUT 2
CUT 2 FOLD
C
SLEEVE CUT 2
TROUSERS CUT 2
C
FOLD
FOLD
C
HAT
C
LEG
CUT 4
C
UPPER & TONGUE
CUT 2 C
COAT TAIL
CUT 2
BACK
UPPER
CENTRE
BACK
CUT 2
TUNIC
CUT 2
FOLD
SOLE CUT 2, C
FOLD
TROUSERS CUT 2
SOLE
CUT 2
CENTRE FRONT
LAPEL CUT 2
FOLD SHIRT
UPPER
CUT 2

1 square=1in.

KITCHEN KATE AND A DOLL'S BED

The body is made of red felt with shirt front, collar, and lapels added.

Sew the head pices together, turn and stuff them, and mould the head into a nice round shape. Cut circles of white and black felt for the eyes, and pieces of red for nose and mouth; sew them in place with tiny stitches of matching silk.

Make up the hands and stuff them firmly. Cut out the body and the lapels in red. If using felt, stitch the parts together with close overcasting and do not turn them inside out. Stitch on the hands and stuff the body. Cut the coat tails and stitch them to the back of the waist. Stitch the shirt front in place and add the lapels. Cut the trousers in striped material, leaving turnings, sew them together, turn, stuff firmly, and sew them to the body.

Attach the head and put on the white wing collar, cut from felt. The bow is cut in one piece from blue felt, with a little strip sewn down at the middle to make the knot. The hair is made of black fur or wool loops sewn in the same way as the clown's.

The boots are made separately of felt, kid, or shiny American cloth. Stuff the toes and stitch the boots on the ends of the legs, leaving the tops pointing outward slightly.

Kitchen Kate

This is a doll for Mother! She is made of a dish mop, wooden spoon, dish cloth, polishing cloth, duster, and pot scrub—all very useful but not very exciting as a present. Assembled as Kitchen Kate, the Daily Helper, she will be sure to cause a sensation when the parcel is opened on Christmas morning.

Kitchen Kate.

The doll's bed.

Draw a face on the back of a wooden spoon, place the dish mop behind and arrange it as hair. Tie the two handles together with string and use the polisher, which is a yard of mutton cloth, to make a body. Fold a yellow duster in half lengthwise and pleat it to form a skirt, pinning it to the polisher at the "waistline." The dishcloth folded diagonally makes the shawl, and the saucy beret is a copper wire pot scrub.

Doll's Bed

Though a sumptuous affair, fit for a miniature film star, the doll's bed illustrated is easy to make with a few pretty scraps and a little care. The basis of the bed is of cardboard. A soap box is a useful size, but for a special doll the bed may have to be larger. In any case the bed must be twice as long as it is wide and the height should be about one-third the length. The head board can be any desired height; about two-thirds the length of the bed looks well.

Start by making the box the right size, cutting it down so that the upper mattress surface will be level with the edges. Next cut the foot and head boards as shown in Fig. 2. Fix the foot board firmly in place with glue or strong stitches. Cut a piece of wadding or cotton wool the same shape as the head board and just long enough to reach the mattress top. Dab a little glue on the cardboard to hold the wadding in place. Cut a piece of material to cover the whole surface and leave good turnings. Take some matching silk and "button" the cover right through padding and cardboard with two or three tiny stitches crossing one another. The positions of the "buttons" can be marked lightly in pencil to help keep the correct distances. Pull the turnings over to the back of the card and stick them down with a very little glue. Attach the head board to the bed, then put the back cover in position and seam neatly all round the edge, pulling both covers taut as the stitching proceeds.

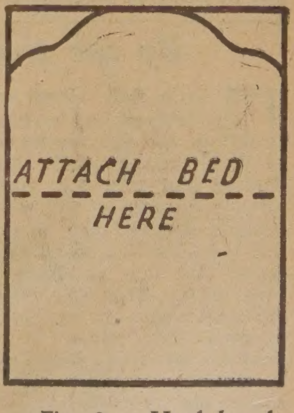
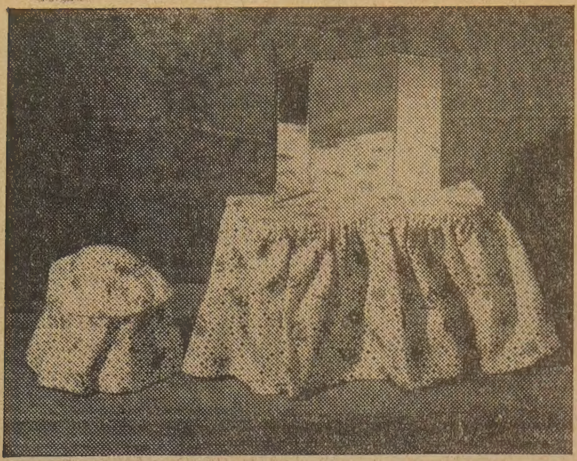


Fig. 2 — Head board dimensions. Height two-thirds length of bed.



The doll's dressing table and stool.

For the valance cut a piece of material one and a half times or twice as long as the distance round the two sides and foot, and deep enough to allow turnings at hem and top; if a selvedge is used for the hem, only the top turning will be needed. Gather the frill and attach the valance at each side of the head board; distribute the fullness evenly round the bed and oversew to the cardboard.

The mattress is made like a cushion but buttoned at intervals in the same way as the padded head board. Snippings of rag will do to stuff the mattress and a little pillow.

One under-blanket and two others are made of pieces of flannelette, the top and bottom blanket-stitched and the sides left unfinished. The sheets can be made of soft white cotton—washed salt bags are just the right weight—hemmed down the sides and at top and bottom. Make the top hem wider than the bottom and the bottom hem wider than the side ones, and be sure to have both blankets and sheets wide enough to be tucked well under the mattress.

If the head and valance are made of plain material, have the coverlet in a pattern, or vice versa, or make the coverlet in a different colour. Cut it by a thread or tear it so that it is quite straight. Fringe all the edges by ravelling out the threads to a suitable depth.

For a crowning touch of luxury make an eiderdown. Sandwich wadding between two pieces of material and put in rows of machine stitching round the edges with a simple shape—a diamond or something similar—in the centre.

The bed illustrated has shell pink satin head board, valance, and quilt, shell pink flannelette blankets and mattress, white crepe rayon sheets and pillow, and a pink flowered crepe coverlet.

Dressing Table and Stool

Little sister will love the pretty dressing table and stool, and they are easy and quick to make with pieces of small patterned material, cardboard, glue, and a small mirror. The dressing table can be any size but be sure to keep the same proportions as given in the diagram (Fig. 3), or the finished piece will not look right.

Cut the cardboard to the size for the sides and back of the table. Make two little shelves by cutting card the same depth and a little longer; cut them almost through at each end, turn them down, and stick the turned-down pieces on to the sides of the table. Cut the kidney shape and stick it on for the top of the table.

Cut the material to the shape of the top allowing a turning; snip the curved edges, stick them underneath the top, and leave them to dry. Cut material twice as long as the curved edge and the right depth, allowing for turnings. Gather the top and attach it to the material stuck on the table top by overcasting between the gathers.

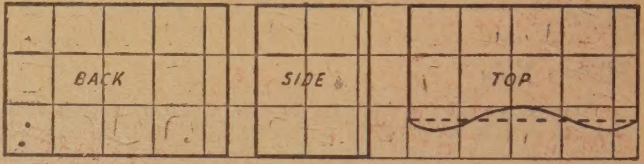


Fig. 3—Dimensions for dressing table.—Length=1½ times height; width=½ length; top width=width plus curve.

Make a tube of carboard, fill the top for a padded seat, and cover it with material, sticking the edges down securely. Make a frill three times as long as the circumference of the stool and deep enough to cover it entirely. Make a narrower frill twice as long as the circumference, and sew both to the top cover.

The winged looking-glass is made from a handbag mirror with two strips ¾in. wide cut from it. Warm adhesive tape and stick it down the joins at the back. The mirror must be cut with a glass cutter, so it may have to be done at the paint shop. Be sure to put the cut edges together so that no sharp edges are exposed to scratch the fingers.

Photographs by Sparrow Industrial Pictures, Ltd.

By the Sea

THE train flew along so fast that the hedges and cows seemed to be flying, and yet somehow it seemed as if I'd never reach the seaside. Mother had told me that I would catch a glimpse of the sea before we actually reached the station. "What will it be like?" I asked over and over again, and then suddenly I saw it—THE SEA. The SEA that sank a thousand ships, or rippled softly over dimpled toes. Soon it would be tickling my toes, my bucket would be holding a quart of salt tangy water, my eyes would see the rocks, the cliffs, the sandy beach, and I would live for a whole week like a fairy princess in a house by the sea!

The station was simply marvellous to me; all the advertisements were completely different from those at home. The boarding house was different from any house I'd ever lived in; it gave you the feeling of being quite grown up, for did they not pass you the cruet as if you were 16 at the very least?

After tea there was a walk along the parade, upon which walked a never-ending crowd of such delightful people, and then to bed, with the wonderful sound of the sea and dreams about a glorious tomorrow.

Next morning after breakfast we went straight to the beach, and a day of enchantment began. The English Channel! What a sea! What pools and crabs! What sea anemones! What star fish! Then a shout from mother, and then there were ice creams from the Italian man. You could choose between a cone or wafer—imagine it, being able to choose after he had walked right down to find your mother. Then there were sandwiches and lemonade, and after lunch, would you believe it, the Punch and Judy man came and started his show right on our little bit of beach. There were trips to the castle, trips to the glen, and afternoon tea with every cake iced. It was a real holiday!—

"Yoell," Napier.

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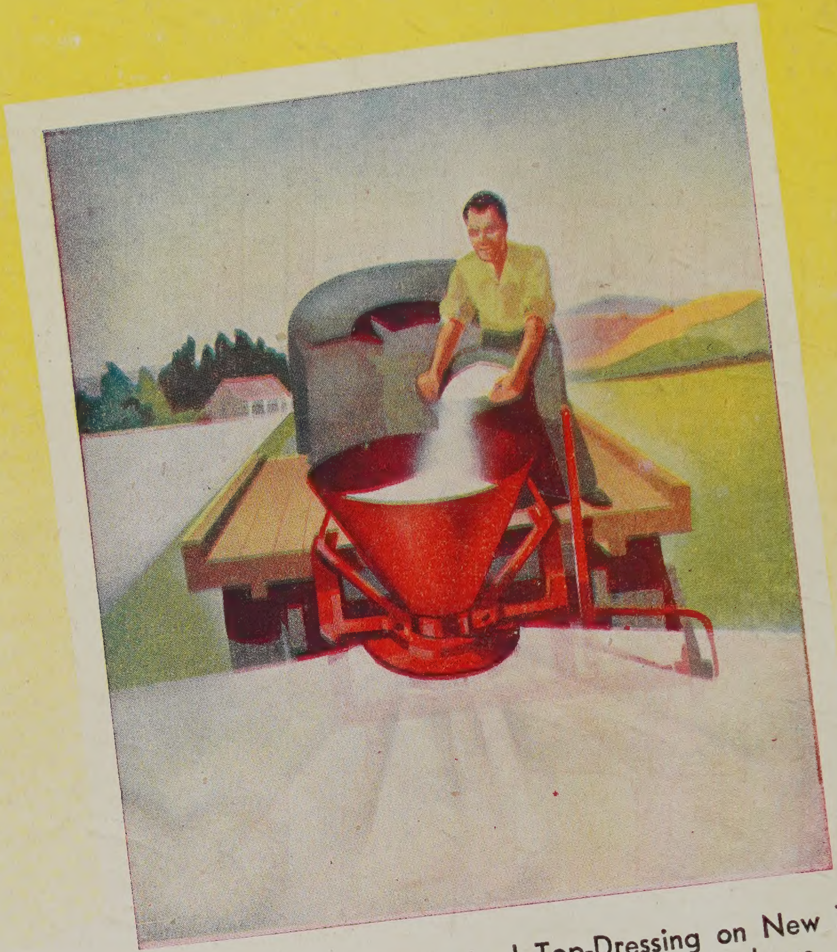

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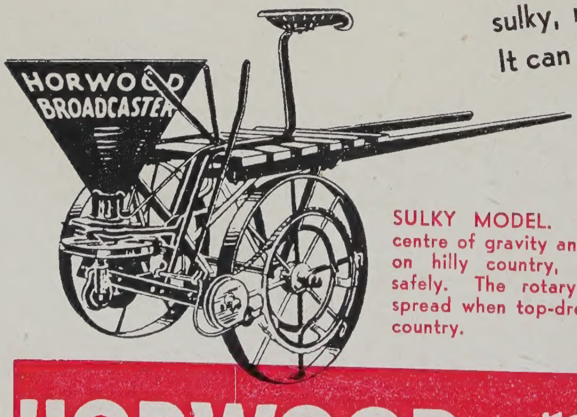

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